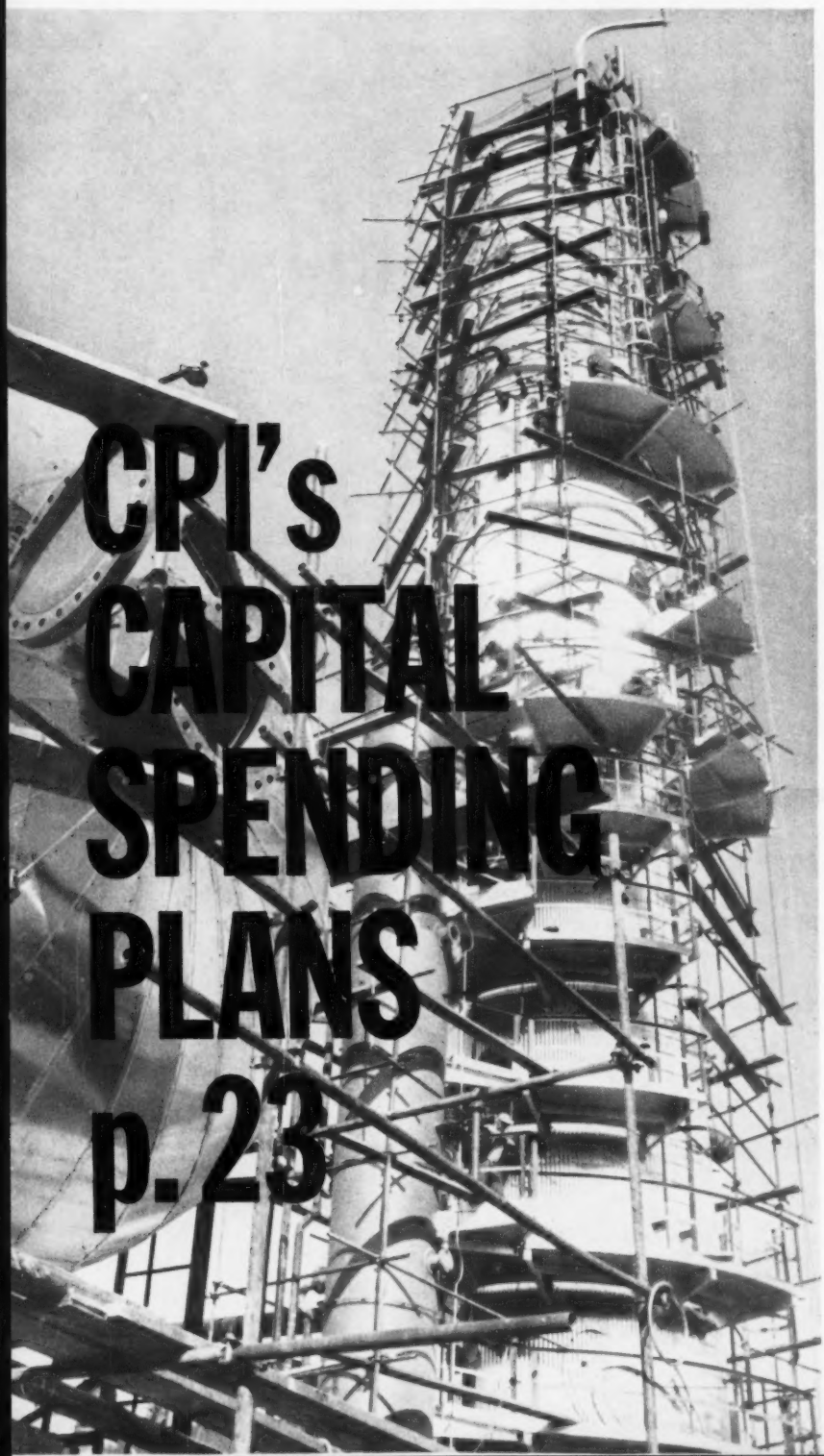
NOVEMBER 11, 1961

Chemical Week

A McGRAW-HILL PUBLICATION PRICE FIFTY CENTS



CPI's CAPITAL SPENDING PLANS p.23

Din over 'dumping' —U.S. and European producers trade accusations p.21

California Chemical flexes marketing muscles for new selling push p.39

TEL-TML preview: Here's process Nalco will use in Freeport, Tex., plant p.63

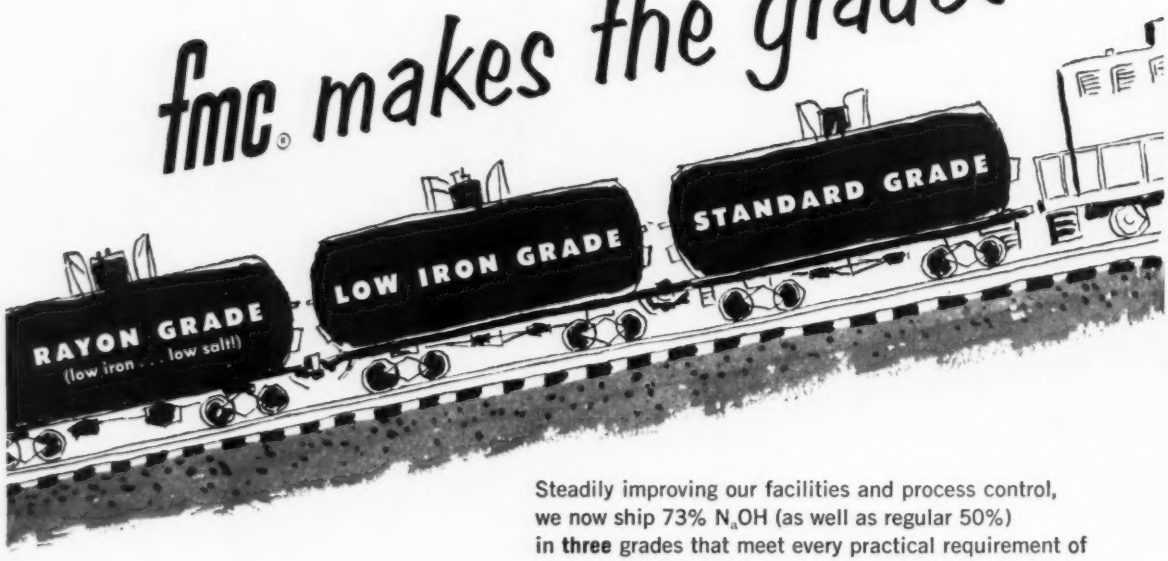
Power breakthrough— new dc. generators slash installation, operating costs . . p.83

Europe's aerosolers prosper. Look for 35% sales gain this year p.89

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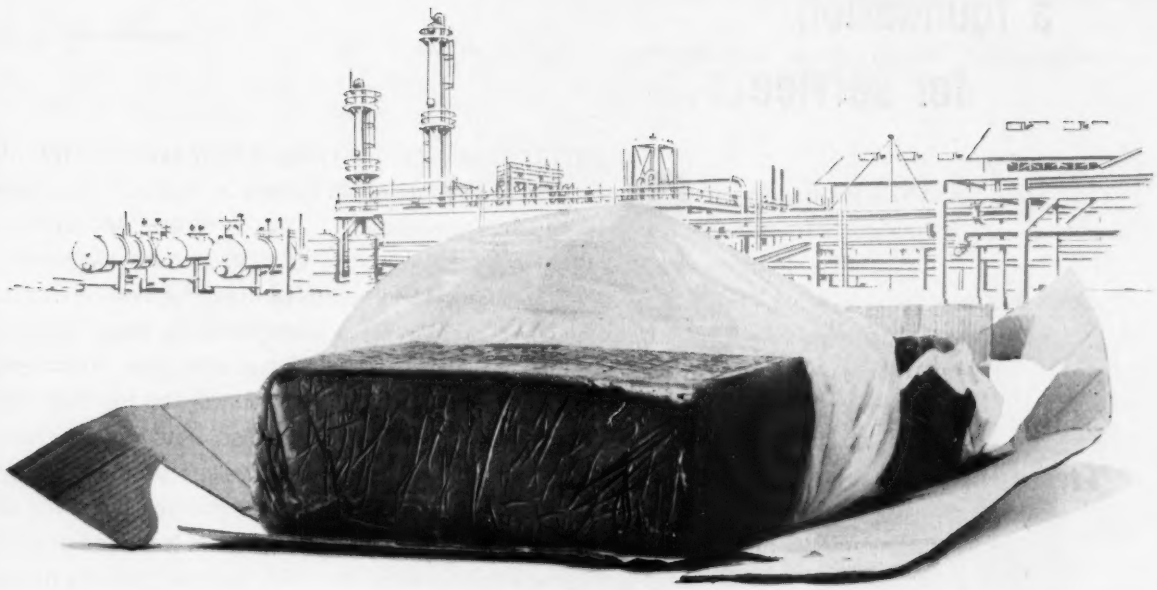
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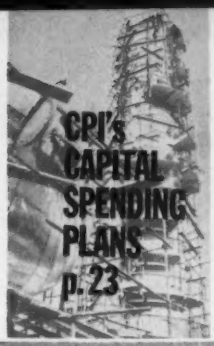
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ON THE COVER: Partly completed distillation column serves as background for news of McGraw-Hill capital spending survey. For preview of CPI's construction plans, see p. 23.

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Our Role in Civil Defense

A LETTER in this issue *(p. 6)* demonstrates that a lot of people aren't sold on fallout shelters. There's no doubt either that civil defense preparations by the federal government have been sporadic and lackadaisical ever since the cold war started not long after World War II. Every once in a while the sirens blow here in New York, and people are herded into the nearest shelter. But they generally regard it as a nuisance to be tolerated, rather than practice for survival.

We confess that we don't feel particularly concerned—and our conscience twinges a little because we don't. The reason for this indifference, perhaps, is that there are conflicting opinions, even among the experts. There is a psychological problem, too, in that we like to think it is contrary to our proud nature to run like rabbits into a hole when trouble brews.

Our unconcern could be costly. How can we be shaken out of our apathy? Here's one suggestion:

The chemical process industries, many firms of which have been contractors to the Atomic Energy Commission or have undertaken private atomic projects, know as much about the problem as anyone. Industry—as citizens—could arouse us by speaking out on the civil defense problem as related to nuclear blasts and subsequent radiation. Such expert counsel might carry weight with the unbelievers—and goad them into support of whatever need be done to insure our survival and ultimate victory.

How the South Can Gain

LAST WEEK WE HAD THE OPPORTUNITY of visiting and talking with chemical industry leaders in Memphis, which shares with the rest of the South an enviable growth record in chemical process facilities. In one decade, from 1947 through '57, the East South Central area alone (Kentucky, Tennessee, Alabama and Mississippi) grew in industrial chemicals output from $292 million (5% of the U. S. total) to $935 million (8%).

A combination of factors underlies this growth and augurs well: more industrialization, leading to higher per-capita income and hence a more lucrative home market; good transportation; a favorable labor climate; excellent water supply; availability of raw materials; and relatively cheap power.

But the South will have to come to grips with various problems as industrialization continues:

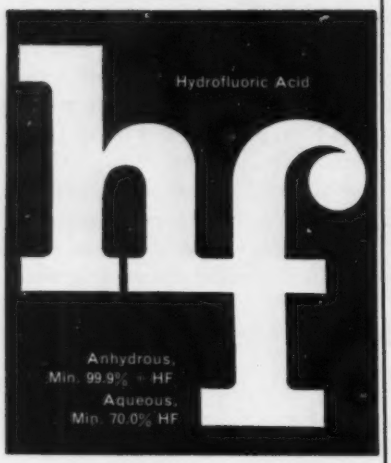
Absentee management. Most Southern plants have their top management elsewhere—men with no vested interest in the South *per se.* This is not necessarily a handicap, since it puts the Southern plant manager on his mettle to justify continuation or expansion in his area.

Attitude toward industry. Many Southern legislatures are heavily weighted with the rural vote. This leads to discriminatory taxes on industry and often a generally hostile attitude.

Water pollution. The same rural orientation may tend to favor the wildlife and conservation interests. Industrial pollution must be kept in check, of course, but a proper balance must be struck between extreme points of view.

If the South can face and overcome these major problems, its resources will assure sound growth in the years to come.

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LETTERS

Fallout Shelter Futile?

To THE EDITOR: Your timely description . . . of the U.S. companies planning to build atomic shelters (*Oct. 14, p. 38*) overlooks the basic futility of having such shelters in the first place. The companies you list as not planning shelters are actually sizing up the situation in a sane manner.

Now what is this basic futility of having these shelters? Your readers can take a few minutes and without trouble calculate what an atomic blast flame consumes in the way of oxygen; it's got to use up oxygen to sustain this combustion, among other things. . . .

On top of that, let your readers next calculate just one of the reaction products and its amount produced in this blast—namely, the quantity of nitrogen dioxide. The latter is one of the celebrated newly discovered air pollutants. Plenty of the latter and no oxygen—who's going to live? . . .

EDWIN J. BARTH, P.E.
Consultant
New York

Neither the fission nor fusion reaction consumes oxygen. Organic matter will, of course, burst into flame.—ED.

Another Route to Hydrogen

To THE EDITOR: Re your interesting and excellent article on hydrogen by catalytic partial oxidation (*Oct. 21, p. 61*), we should like to complete the picture of basic routes to hydrogen by mentioning the relatively recent development of the Topsφe-SBA autothermal process, which has found interest for application in European countries.

It has the flexibility to process a variety of feeds from methane and refinery gases through LPG to naphtha at pressures in excess of 250 psig. It is a combination of partial oxidation and reforming with steam in the presence of a nickel catalyst in the reaction vessel. The process utilizes oxygen-enriched air when making synthesis gas for ammonia, and uses only oxygen when hydrogen is the ultimate product. The process is operating commercially in Europe, working on LPG with as much as 20% olefins in one case and on methane in another case.

More and more interest in this process is developing, and additional units of quite large capacity are currently in the design stage for synthesis gas for ammonia and methanol.

MARTIN J. BARRY
Executive Vice-President
Haldor Topsφe, Inc.
New York

Comments on Pricing

To THE EDITOR: In your Viewpoint editorial "Strong Words on Pricing" (*Sept. 30*), I'd say your correspondent hits the nail right on the head!

I'm an old-timer, like your correspondent, and my experience—particularly in recent years—has been the same as his, practically as to line and verse.

I'd recommend his statements as required reading for . . . top management and market researchers.

NAME WITHHELD

To THE EDITOR: Re your Viewpoint titled "Strong Words on Pricing" (*Sept. 30, p. 7*).

After 40 years in the chemical business, it is my hunch there is more than a grain of truth in each of the accusations of your anonymous correspondent.

Based on what has been here written, however, I completely dismiss this instinctive feeling as grounds for a valid conclusion. Your contributor has documented nothing.

Letting off steam can be a healthy project for older individualists, active or inactive; but, so far, that is all the charge seems to represent. It would take facts, and nothing else, to convince me that I'm right or wrong.

LEO TRUBEK
Business Consultant
Brielle, N.J.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 West 42nd St., New York 36, N.Y.

TO THE EDITOR: Re your Viewpoint (*Sept. 30*) I strongly suspect that your "well-known chemical industry man" is suffering from the well-known malady of "too many knives in the pie."

Agreed, overcapacity is rather lamentable. However, so isn't undercapacity? It depends on the side of the fence you are on. It is inconceivable that a million or so dollars are spent, based simply on a magazine (however estimable) forecast. I propose that the so-called feather-merchants are lured into the market more by inordinately high "administered" prices than by forecasted volumes.

Furthermore, I should propose that all executives who require their sales managers to "guarantee" future customers should, in turn, be required to "guarantee" full support down to the wire on all necessary marketing and merchandising efforts.

HOWARD G. WOMACK
The Hague, Holland

Foreign Filter Aids

TO THE EDITOR: We have read with great interest your article on filter aids (*Aug. 12, p. 33*).

Since this article deals mainly with the American production, we thought that your readers might wish to have some information on the European production of filter aids, which is not to be underestimated.

Firms such as C.E.C.A. (mentioned in your article), Kieselguhr Industrie, etc., represent an output potential far from negligible.

C.E.C.A., first European manufacturer in this field, has developed, with success for more than 15 years, its production of Clarcel filter aids with full range of filtering and clarifying characteristics. These filter aids were originally made only from diatomite, of which C.E.C.A. owns important deposits of high quality, with considerable reserves. More recently C.E.C.A. exploits its own raw material, quality of which is equal to the best known.

In the particular field of expanded perlite its potential is among the most important in Europe.

A. MAZUIR
Directeur General
C.E.C.A.
Paris, France

MEETINGS

American Petroleum Institute, 41st annual meeting, Conrad Hilton Hotel, Chicago, Nov. 13-15.

Seventh International Conference on Magnetism and Magnetic Materials, Westward Ho Hotel, Phoenix, Nov. 13-16.

American Public Health Assn., 89th annual meeting, Cobo Hall, Detroit, Nov. 13-17.

American Meteorological Society, general meeting, Tallahassee, Fla., Nov. 14-16.

Chemical Marketing and Economic Group, New York section, "Trends in Developing Profitable Chemical Projects," Fifth Avenue Brass Rail restaurant, New York City, Nov. 14.

Material Handling Institute, Southwest Show, Dallas, Nov. 14-16.

National Associated Marine Suppliers Inc., third annual Marine Suppliers and Equipment Show, Hotel Roosevelt, New York City, Nov. 15-17.

Manufacturing Chemists' Assn., 11th semiannual meeting, Hotel Commodore, New York City, Nov. 21.

American Society of Mechanical Engineers, ASME winter annual meeting, Statler Hilton Hotel, New York City, Nov. 26-Dec. 1.

American Management Assn., special materials conference, Savoy-Hilton, New York City, Nov. 27-29.

28th Exposition of Chemical Industries (Chemshow), New York Coliseum, New York City, Nov. 27-Dec. 1.

National Assn. of Corrosion Engineers, Southeast regional conference and Florida general conference short course, Miami, Nov. 27-Dec. 1.

Chemical Market Research Assn., national meeting, Mark Hopkins Hotel, San Francisco, Nov. 28-Dec. 1.

Western Petroleum Refiners Assn., computer conference for refiners, Tulsa, Nov. 28-29.

Building Research Institute, '61 fall conferences, Mayflower Hotel, Washington, D.C., Nov. 28-30.

American Institute of Chemical Engineers, 54th annual meeting, Hotel Commodore, New York City, Dec. 2-6.

Eastern Joint Computer Conference, Sheraton-Park Hotel, Washington, D.C., Dec. 3-7.

Chemical Specialties Manufacturers Assn., 48th annual meeting, Hotel Roosevelt, New York City, Dec. 4-6.

Synthetic Organic Chemical Manufacturers Assn., annual meeting and dinner, Hotel Roosevelt, New York City, Dec. 7.

Pharmaceutical Manufacturers Assn., Eastern regional meeting, Waldorf-Astoria Hotel, New York City, Dec. 11-13.

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ACTION DESIRED:	Consider them for synthesis, purification, for your research projects		

Hydroxylamine salts have reactivity characteristics possessed by no other chemical. Industry is now using these versatile nitroparaffin derivatives in ever increasing quantities, and new applications are continually being discovered. As reducing agents, oxidizing agents – for synthesis, purification and biological systems – hydroxylamine salts offer you unlimited opportunity in research and product development.

Oxidation—reduction.

Hydroxylamine salts are well-known reducing agents for metal ions such as ferric, cupric, and silver, and also for non-metallics such as organic peroxides and certain dyes. Because of this property, these salts have found industrial applications in dyeing, purification, and refining processes. The salts are very stable in acidic media, a property not possessed by many reducing agents.

Less well known, however, is the action of hydroxylamine as an oxidizing agent. This property has received little study, but it warrants your further investigation —particularly where oxidizing agents now used are not fully satisfactory.

For dyeing synthetic fibers.

Hydroxylamine sulphate is an ideal reducing agent in the cuprous ion method for dyeing synthetic fibers. One step in the process is the reduction of the cupric ion to the cuprous form, and hydroxylamine sulfate is reported to act as a reservoir for the cuprous ion as it is formed, thus avoiding precipitation of metallic copper which would result in dull colors. (It has also been reported that hydroxylamine acts directly on the fibers and makes them more easily dyed by direct wool dyes. It is possible that this process will soon displace the cuprous ion method when it has been more thoroughly evaluated.)

Shortstopper for synthetic rubbers.

The sulfate and chloride salts of hydroxylamine are used as non-discoloring shortstoppers in the production of butadiene-styrene rubber, GR-N-type synthetic rubber, and other polymers. In this use the hydroxylamine is added to inhibit further polymerization when the reaction has reached the desired conversion. The result, when hydroxylamine is used, is rubber with better color.

And reports from users indicate that CSC hydroxylamine salts have been, and are now being used, with *both* hot and cold polymerizations. What's more, their use is *not* confined to specialty rubbers, but they are also being used successfully with all-purpose synthetic rubber of the styrene-butadiene type.

The principal reason behind the increased use of hydroxylamine is the better color it produces in rubbers as compared with hydroquinone-stopped synthetics.

For synthesis.

The hydroxylamines are valuable for chemical synthesis of oximes, hydroxamic acids, and numerous intermediates—also for preparation of anti-skinning agents,

Physical Properties	HYDROXYLAMMONIUM ACID SULFATE	HYDROXYLAMMONIUM SULFATE	HYDROXYLAMMONIUM CHLORIDE
Formula	$NH_2OH \cdot H_2SO_4$	$(NH_2OH)_2 \cdot H_2SO_4$	$NH_2OH \cdot HCl$
Molecular Weight	131.11	164.14	69.50
Melting Point, °C	Indefinite	177*	152*
pH of 0.1M Aqueous Solution at 25°C	1.6	3.7	3.4
Solubility at 25°C, g/100 g solvent			
In Water	Approx. 390	63.9	94.7
In 95% Ethanol	4.3	0.2	10.5
In Methanol	20.2	0.1	17.5

*Melts with decomposition.

anti-rusting agents, and pharmaceuticals. For example, hydroxylamine reacts readily with aldehydes and ketones to give high yields of oximes which are useful in a variety of applications, including the preparation of antioxidants and stabilizers. When added to inks and paint, oximes are useful as anti-skinning agents.

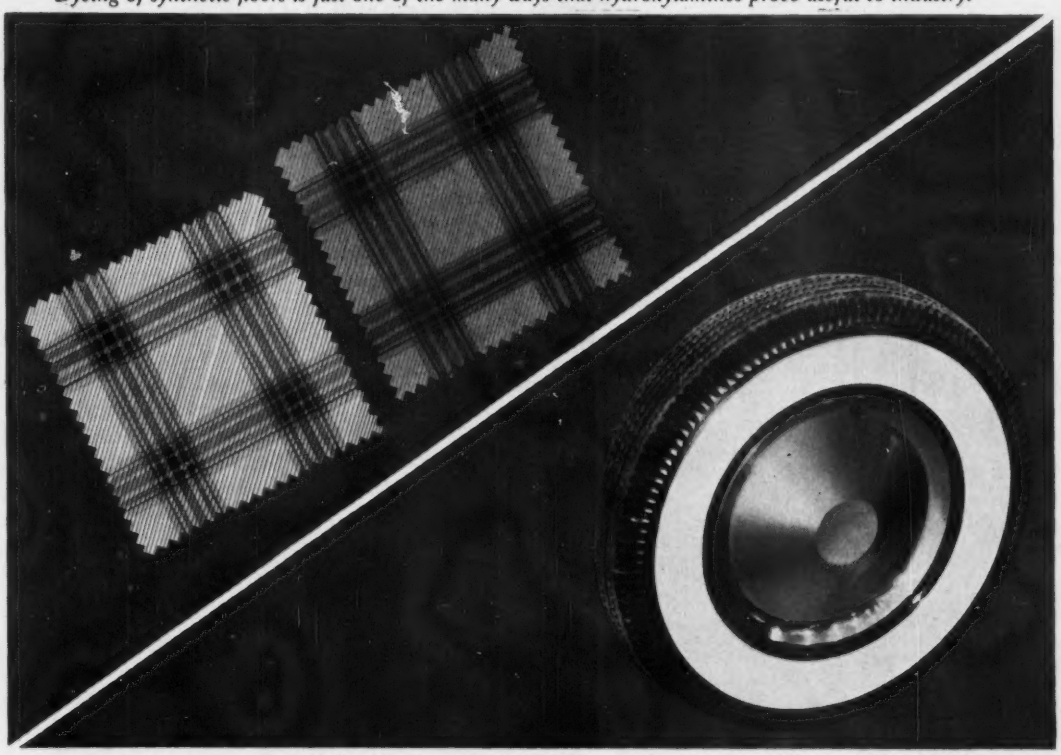
Effects on proteins and biological systems.

Hydroxylamines inhibit certain enzymes, such as catalase. Gelatin treated with hydroxylamine shows considerable resistance to acid etching. It also inhibits bacterial growth, and many of its derivatives have fungicidal properties. And hydroxamic acid, prepared from hydroxylamine, possesses interesting pharmacological activity.

Can hydroxylamines help you explore new fields within your field?

Most probably the answer is "yes." With their unique properties and wide range of utility—plus the fact that they are now available in commercial quantities at moderate prices – hydroxylamines possess unlimited potential. They offer you unlimited research and product development opportunity.

There is a difference in color when synthetic fiber (on left) is treated with hydroxylamine during dyeing. Dyeing of synthetic fibers is just one of the many ways that hydroxylamines prove useful to industry.



Another of the many uses of hydroxylamine salts is in rubber production to achieve brighter, clearer color.

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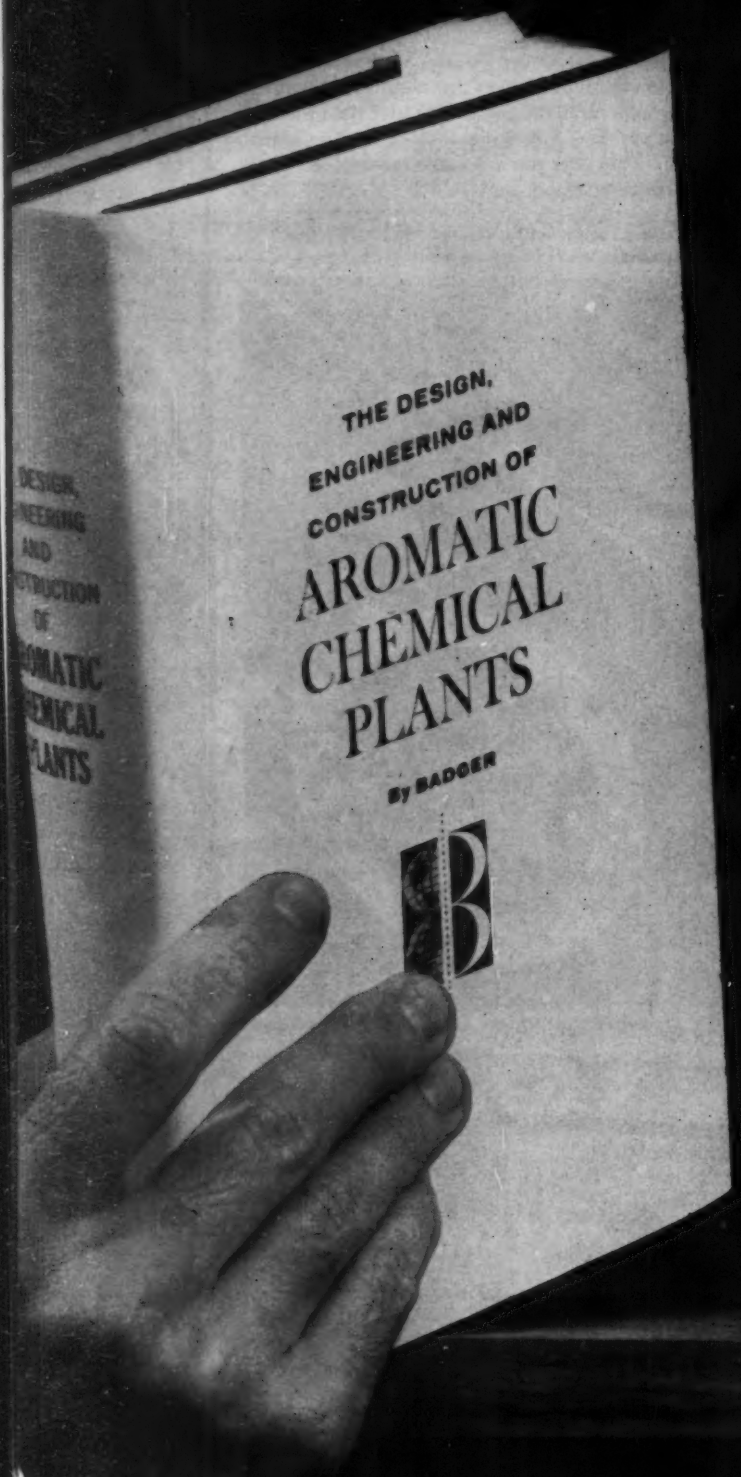
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These impressive figures tell only some of the reasons why Badger could "write the book" on aromatics — whether it involves the production of crude products . . . their purification . . . or their conversion into other organic products. Without exception the plants demonstrate the exceptional creativity which is an important part of the stock in trade at Badger. In fact, many of them owe their existence to totally new — in some cases revolutionary — design and engineering ideas. Others, based on more classical engineering concepts, could have been routine plants producing routine products at routine costs. That they are not is again due to the full measure of creativity Badger has brought to their detailed engineering and construction.

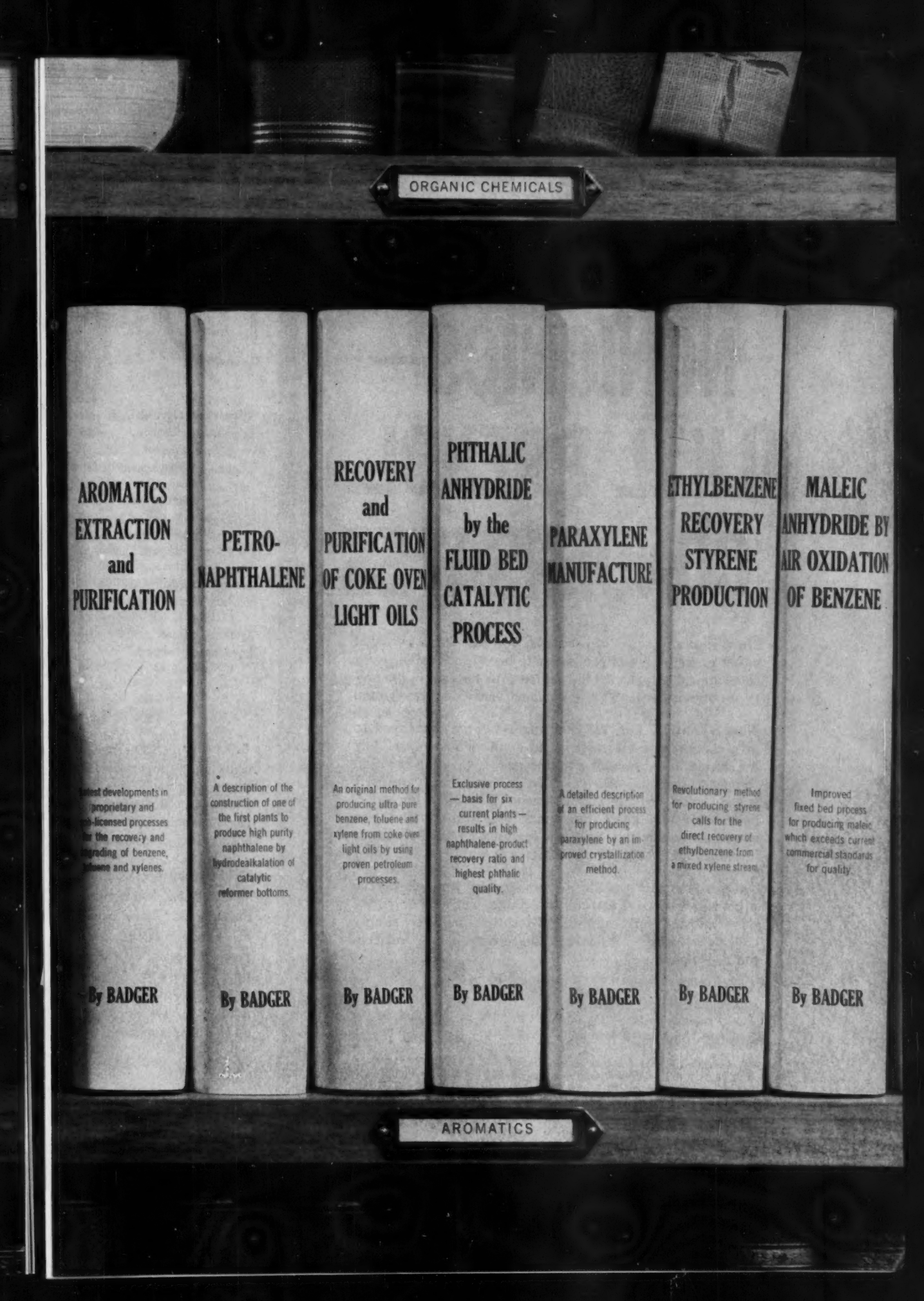
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4 NEW STEROX® NONIONICS — ALKYL PHENOL CONDENSATES

Now, in many types of products, you can "zero in" even closer on a number of properties to boost performance and sales appeal. Monsanto has added four new alkyl phenol-type nonionics to its STEROX line of surface-active agents.

New STEROX DF, DJ, NJ and NL were developed to give consistent performance and genuine economy. They are stable in acidic and alkaline media, even at elevated temperatures, and are effective in both hard and soft water. They provide *specific advantages* where low odor, light color and good detergency are wanted; and also where emulsification, wetting, foaming characteristics or liquid-solid contact is important.

To discover the specific advantages to you, check the table shown here. Then use the convenient coupon to get more information, samples and technical help. Or simply call your nearby Monsanto representative or service-minded distributor.

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Please send me ( ) Technical Data Sheets on new STEROX DF, DJ, NJ and NL.
( ) Comparison Card describing *16* STEROX and SANTOMERSE surfactants.

Name .....

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Monsanto **STEROX**

DF

Ethylene oxide adduct of:	dodecyl phenol
Color, APHA (typical)	180
pH, 1% solution (typical)	7.0
Cloud Point, °C. (1% solution)	below 0
Foam, Ross Miles, cm. (0.1% @ 50°C.)	
25 ppm water, inst.	2.0
after 5 min.	1.9
150 ppm water, inst.	1.8
after 5 min.	1.7
Surface Tension (0.25% @ 25°C.)	32.7
Interfacial Tension (0.25% @ 25°C.)	2.3
Spreading Coefficient	—0.5
Draves Wetting Time, sec. (0.25% @ 25°C.)	75

Solubility... Miscible with water in all proportions. Soluble in many nonpolar solvents. Functions well wherever a surfactant would be desirable in oils or aliphatic solvents.

Other Promising Characteristics... Valuable intermediate for sulfation. Conversion produces high-foaming active ingredients especially suited for liquid detergents. Unreacted, it is a low-foaming surface-active agent for use *per se* and an excellent emulsifier.

Typical uses... In liquid detergents, emulsifiable toxicant concentrates, metal cleaning and treating compounds; as a paper rewetting agent and an emulsifier in a variety of applications.

Monsanto **STEROX**

DJ

Ethylene oxide adduct of:	dodecyl phenol
Color, APHA (typical)	100
pH, 1% solution (typical)	7.0
Cloud Point, °C. (1% solution)	40
Foam, Ross Miles, cm. (0.1% @ 50°C.)	
25 ppm water, inst.	2.9
after 5 min.	2.5
150 ppm water, inst.	2.8
after 5 min.	2.5
Surface Tension (0.25% @ 25°C.)	34
Interfacial Tension (0.25% @ 25°C.)	1.9
Spreading Coefficient	−1.4
Draves Wetting Time, sec. (0.25% @ 25°C.)	12
Detergency, unbuilt @ 60°C., 0.2% in 150 ppm water, as % lauryl sulfate	102

Solubility... Soluble in water and most polar solvents, but generally insoluble in nonpolar solvents.

Other Promising Characteristics... Low foam and high chemical stability are combined with effective functional properties and ease of use. Lack of odor typically associated with this type of surface-active material makes perfuming easier—helps build market appeal for your products.

Typical uses... In liquid and powdered detergents, chemical processing, textile dyes and scouring agents, and numerous compounds for metal cleaning and treating, paper de-inking, felt washing and other wet processing operations.

Monsanto **STEROX**

NJ

Ethylene oxide adduct of:	nonyl phenol
Color, APHA (typical)	50
pH, 1% solution (typical)	7.0
Cloud Point, °C. (1% solution)	54
Foam, Ross Miles, cm. (0.1% @ 50°C.)	
25 ppm water, inst.	12.9
after 5 min.	8.3
150 ppm water, inst.	12.7
after 5 min.	8.0
Surface Tension (0.25% @ 25°C.)	34.8
Interfacial Tension (0.25% @ 25°C.)	2.9
Spreading Coefficient	−3.2
Draves Wetting Time, sec. (0.25% @ 25°C.)	5
Detergency, unbuilt @ 60°C., 0.2% in 150 ppm water, as % lauryl sulfate	102

Solubility... Soluble in water and most polar solvents, but generally insoluble in nonpolar solvents.

Other Promising Characteristics... Exceptionally light colored, this "wheel horse" nonionic is effective *per se* as an emulsifier and as a light-duty detergent for hard surfaces. In combination with SANTOMERSE alkyl aryl-sulfonates, it exhibits foam-stabilizing effects, and produces a denser foam than that obtained with alkyl aryl sulfonates alone.

Typical uses... In liquid and powdered detergents, insecticides, and in numerous compounds for textile, paper and leather processing, chemical processing, petroleum acidizing and secondary recovery.

Monsanto **STEROX**

NL

Ethylene oxide adduct of:	nonyl phenol
Color, APHA (typical)	100
pH, 1% solution (typical)	7.0
Cloud Point, °C. (1% solution)	76
Foam, Ross Miles, cm. (0.1% @ 50°C.)	
25 ppm water, inst.	15.5
after 5 min.	8.8
150 ppm water, inst.	15.6
after 5 min.	8.6
Surface Tension (0.25% @ 25°C.)	36.2
Interfacial Tension (0.25% @ 25°C.)	4.3
Spreading Coefficient	−6.0
Draves Wetting Time, sec. (0.25% @ 25°C.)	7
Detergency, unbuilt @ 60°C., 0.2% in 150 ppm water, as % lauryl sulfate	103

Solubility... More soluble than Sterox NJ. Especially useful in solutions containing inorganic salts or SANTOMERSE® alkyl aryl sulfonates.

Other Promising Characteristics... Primarily designed for use in liquid detergents. Exceptionally valuable for this application in combination with Monsanto TKPP. Effective *per se* as an emulsifier and light-duty detergent for hard surfaces. In combination with SANTOMERSE alkyl aryl sulfonates, it exhibits foam-stabilizing effects and produces a denser foam than that obtained with alkyl aryl sulfonates alone.

Typical uses... In liquid detergents, industrial cleaners, textile scouring and soaping-off compounds, many specialty products; as a post-polymerization latex paint stabilizer.

THE MOST COMPREHENSIVE TECHNICAL CENTER in the packaging field assures Continental Can Company's customers—and *their* customers—that new and improved packages will be ready for the dramatic marketing innovations of the '60s.

Located in the Chicago area, the four buildings illustrated here represent an investment of $20,000,000. They are staffed by 700 outstanding scientists and engineers and are equipped with the most modern research tools available.

Central Research and Engineering, where a "dignified disrespect for the way things are done now" is a creed, is devoted to long-range and fundamental research on the frontiers of packaging. *The Metal Research and Development* facility, the first and the largest of them all, concentrates upon new and improved metal containers and fabricating equipment designed to lower costs, increase speeds and improve quality.

Two other buildings—just opened—complete the picture. *General Packaging Research and Development* brings together the paper, plastics and closure technologies of six product divisions and provides an ideal environment for the development of packages made of combinations of materials. And the new *Glass Research and Development* building will be devoted to an advanced technology for the world's oldest packaging material. This technical package adds one more reason why—

Continental has, and will have, the right package for you!

CONTINENTAL CAN COMPANY

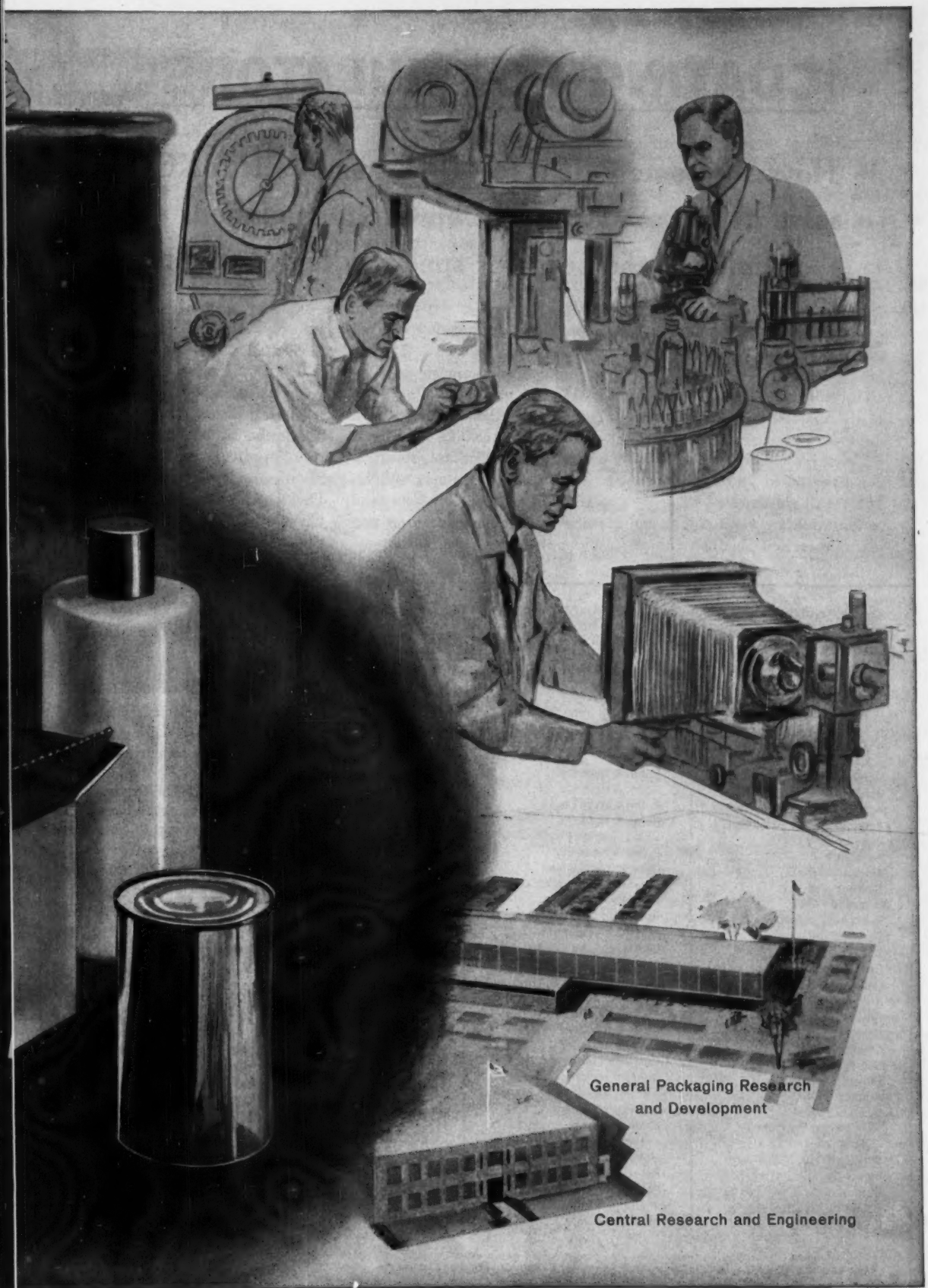
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COATING FORMULATORS:

How Shell's new PENToXONE* and PENToXOL* solvents can save money, improve formulations and eliminate the need for specialty high boilers

SHELL's PENToXONE and PENToXOL are unusually active high boiling solvents.

Together, they constitute a virtually complete high boiler inventory.

Below is solubility data for 30 important resins in PENToXONE and PENToXOL solvents.

With *acrylics, nitrocellulose* and *alkyds,* these new Shell solvents can improve your formulations.

With *vinyls,* PENToXONE lowers solvent cost and improves odor.

With *thermosetting acrylics, epoxies* and *cellulose acetate butyrate,* both PENToXONE and PENToXOL give excellent film properties.

In *urethane systems,* PENToXONE solvent has low isocyanate reactivity, eliminates need for premium priced upgraded solvents.

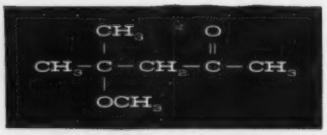
In *polyvinyl butyral lacquers,* PENToXOL can lower solvent cost by 11¢ per gallon and almost double water resistance.

If you'd like to receive samples, plus technical bulletins on all of these applications, write any of Shell's nine Industrial Chemical Division Offices, or directly to Shell Chemical Company, 110 West 51 Street, New York 20, N. Y.

Solubility of resins[1] in Shell's PENToXONE and PENToXOL solvents.

Resin	Supplier	PENToXOL* Solvent Viscosity, Cps., 25°C	PENToXONE* Solvent Viscosity, Cps., 25°C
Nitrocellulose			
R.S. ½-Second Grade, Eight Grams per 100 Mls	—	100	67
S.S. ½-Second Grade, Eight Grams per 100 Mls	—	58	38
Acryloid A-21, 15% Weight	Rohm & Haas Co.	30	22
Acryloid B-44, 15% Weight	Rohm & Haas Co.	25	20
Acryloid B-66, 15% Weight	Rohm & Haas Co.	25	15
Acryloid AT-50, 30% Weight	Rohm & Haas Co.	90	63
Bakelite BKS-2600	Union Carbide Plastics Co.	87	46
Amberol F-7	Rohm & Haas Co.	37	19
Methylon 75108	General Electric Co.	11	5
Beetle 227-8	American Cyanamid Co.	31	26
Uformite F-240	Hercules Powder Co.	11	7
Beckamine P-196	Reichhold Chemicals Inc.	14	8
Cymel 248-8	American Cyanamid Co.	19	11
MM-55	Monsanto Chemical Co.	23	14
Resimene 872	Monsanto Chemical Co.	29	16
Cellolyn 102	Hercules Powder Co.	18	9
Amberol 801	Rohm & Haas Co.	32	17
Aroplaz 2480	Archer-Daniels-Midland Co.	27	24
Rezyl 412	American Cyanamid Co.	13	14
Cellolyn 502	Hercules Powder Co.	25	19
Cellolyn 582	Hercules Powder Co.	17	12
Duraplex ND 77B	Rohm & Haas Co.	42	31
Aroplaz 6006	Archer-Daniels-Midland Co.	27	23
Cycopol 102	American Cyanamid Co.	80	62
Half-Second Butyrate 10% Weight	Eastman Chem. Products, Inc.	117	75
Vinylite XYHL, 5% Weight	Union Carbide Plastics Co.	55	—
Parlon P	Hercules Powder Co.	1260	630
Buton 200	Enjay Chemical Co.	45	31
Epon® 1002, 50% Weight	Shell Chemical Co.	898	240
Epon® 1007	Shell Chemical Co.	229	107

(1) Commercially available resin reduced to 30 per cent weight solids, except as indicated. Viscosities of resulting solutions measured in absolute units with capillary tube viscometers.



Remarkable activity of Shell's PENToXONE high boiling solvent comes from this unique keto-ether structure. The COC of ethers and the double bond O of ketones combine for double action solvency.

Shell's PENToXOL solvent is a very closely related glycol ether.

Both these solvents are true high boilers. PENToXONE'S total evaporation time is 2450 seconds. PENToXOL'S is 3375 seconds.

*Shell Trade Mark.

SHELL

Shell Chemical Company

Industrial Chemicals Division

Business Newsletter

CHEMICAL WEEK
November 11, 1961

Marbon Chemical will make its own styrene monomer. It will start building a 75-million-lbs./year plant at Baytown, Tex., later this year. Completion of the unit is scheduled for late '63. Feedstock (ethylbenzene) will be pipelined directly from Humble Oil's refinery that will abut the new monomer installation.

Monomer from Marbon (a division of Borg-Warner Corp.) will go to make the company's Cycolac (acrylonitrile-butadiene-styrene) line of plastics at Parkersburg, W. Va., and its high-styrene reinforcing resins production at Gary, Ind. Both plants have been hefty buyers of monomer. The new Baytown plant is being designed so its initial capacity can be expanded as needed.

U.S. styrene capacity should soar to about 2.5 billion lbs./year within two or three years, as the Marbon installation and others, planned or under construction, come in. These include whopping 100-million-lbs./-year units: Monsanto, at Texas City and Chocolate Bayou, Tex.; Suntide Refining, at Corpus Christi; the Odessa Styrene expansion, at Odessa, Tex.; among others.

A measure of the upcoming styrene monomer overhang: consumption is currently running at about 1.5-billion-lbs./year—nearly a billion pounds under the capacity total in sight for late-'63 early-'64.

•

Canada may well have an oversupply of sorbitol by early next year. Reason: Atlas Powder Co., Canada, Ltd., will go ahead with earlier plans (*CW Business Newsletter, Nov. 4*) to put up a plant at Brantford, Ont.

Production is expected early in the new year, and, says Atlas, capacity will be "ample to supply Canadian markets." This in the face of Howards & Sons (Canada) Ltd.'s intention to build an 8-million-lbs./year solutions and powder sorbitol plant at Cornwall, Ont. Its unit, says, Howards, will come "onstream in Feb. '62, and should take care of Canadian requirements for some time to come."

•

More on the International Minerals & Chemical-Husky Oil deal concerning the latter's phosphate reserves near Soda Springs, Idaho (*CW, Nov. 4, p. 45*). IMC and Canadian Husky Oil Ltd. (through its U.S. subsidiary Husky Oil) have entered into an option agreement that provides a final development plan for exploitation of the reserves (estimated to contain 50 million tons of ore) within five years.

For the option, IMC has granted Canadian Husky a five-year, interest-free loan (amount undisclosed). Husky may repay the loan in cash, take a smaller equity interest in any company that may be formed to work

the deposits, or sell its phosphate leases outright to IMC on an "equitable basis."

•

A 100-million-lbs./year propylene purification plant will go up at Cities Service's Lake Charles, La., refinery. That's where Hercules will get the high-purity feedstock for its planned 60-million-lbs./year Lake Charles polypropylene plant.

Contract for design, engineering, procurement and construction of the purification unit has been awarded to Badger Manufacturing Co. (Cambridge, Mass.). Completion is slated for late spring '62. Feed for the new propylene plant will come from CS's present refining operations.

•

CPI executives interested in joint ventures will be watching proceedings this week and next in federal district court at Wilmington, Del., where the Justice Dept.'s civil antitrust case against formation of Penn-Olin Chemical got under way.

The government lawyers contend that the Pennsalt Chemical and Olin Mathieson jointly owned subsidiary represents a combination in restraint of trade in sodium chlorate. Penn-Olin's 26,000-tons/year chlorate plant at Calvert City, Ky., started producing two months ago (*CW Market Newsletter, Sept. 16*).

Pennsalt is a producer and Olin a consumer and marketer of sodium chlorate, which led to the trustbusters' contention that Penn-Olin lessens competition and blocks entry of new producers. If the court upholds this view, it may well void the merger route to corporate growth in the U.S.

•

ICI's request for antidumping legislation against U.S. polyethylene imports will get additional backing; Union Carbide Ltd. plans to file its own application with the Board of Trade. Earlier, Monsanto Ltd. said it would support the ICI request (*see p. 21*).

The British UC subsidiary says that since all its production is in the United Kingdom, it is naturally sympathetic to the ICI position and considers "dumping of any sort to be quite unjust."

•

Acrylonitrile operations will soon begin grinding to a halt at Imperial Chemical Industries' plant at Billingham, England. Reason for the shutdown: to switch processes from the present acetylene-hydrogen cyanide to the newer propylene-ammonia route. ICI says that the present process has been made "uneconomical by price cuts" due chiefly to U.S. acrylo overcapacity.

Shutdown of the estimated 10,000-tons/year plant (for about a year), means that Chemstrand Ltd.'s $9-million Acrilan plant in Northern Ireland will have to go a new supply source. Chemstrand refuses to divulge details, says only that "alternative arrangements are under way."

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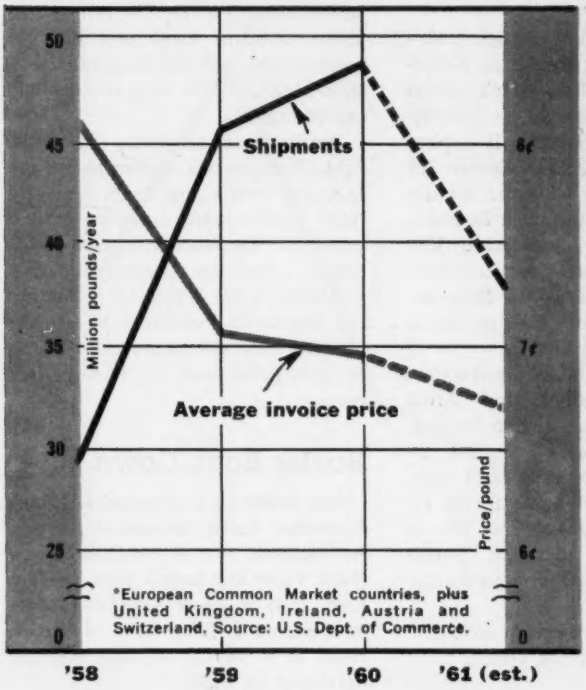
BUCKEYE CELLULOSE CORPORATION

Cotton linter pulp mill at Memphis, Tennessee/Wood pulp mill at Foley, Florida

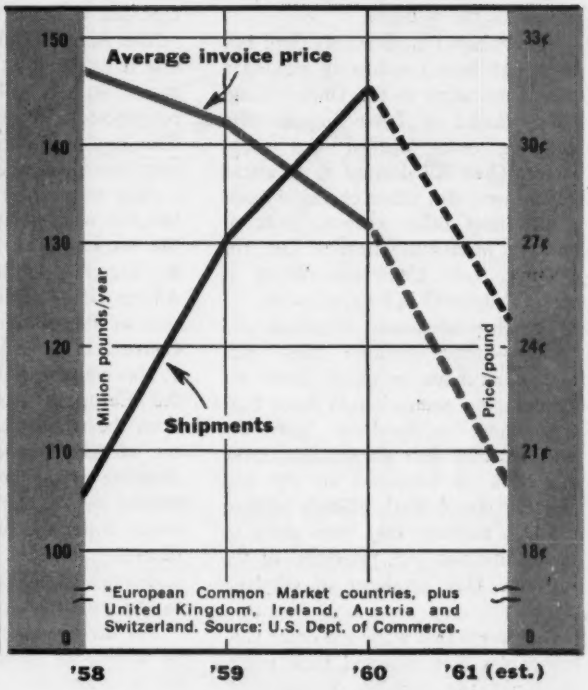
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Polyethylene from U.S. to Europe*



'Dumping'—Charges Fly Both Ways

Vociferous new charges of "dumping"—on both sides of the Atlantic—last week pointed up the fact that tougher competition between U.S. and European chemical producers is prompting new tactics in foreign trade relations.

• In Europe, Britain's Imperial Chemical Industries is asking the Board of Trade for antidumping legislation against polyethylene imports from the U.S. The French government has slapped a 6.43¢/lb. special import tax on polyethylene shipped into France by Spencer Chemical International (*CW Business Newsletter, Nov. 4*). West Germany's government —armed with a tough new antidumping law that will come into effect Jan. 1—has started probing alleged dumping of U.S. chemicals, is already convinced "that Americans are dumping polyethylene at extremely unrealistic prices." And the European Economic Community — otherwise known as Euromart—has launched a study on how to combat dumping from nonmember nations.

• In the U.S. the Treasury Dept.'s Bureau of Customs is carrying out antidumping investigations on tetracycline antibiotics from Italy and refined camphor from Taiwan (Formosa), and has stopped appraising those imports—a move that industry experts say is "a substantial deterrent to continued import of low-priced products." And next week in New York, members of Synthetic Organic Chemical Manufacturers Assn. will hear a report on policies being formulated by their Board of Governors concerning the Kennedy Administration's newest moves toward "freer trade" (*see p. 22*).

It's clear that trans-Atlantic exporting has been a big element in price and availability of numerous important chemicals. Two currently prominent examples of rising imports and falling prices: polyethylene in Europe and trichloroethylene in the U.S. (*charts, above*).

In both of those situations, present outlook is for imports to taper off this year as local production takes over larger shares of the growing markets. Although economic considerations seem to be the real determinants in both cases, local producers have tried to hasten their victory over foreign rivals by asking for government intervention.

U.S. producers of trichloroethylene filed charges of dumping several years ago, but the Treasury Dept. found that the imports were not underpriced relative to foreign markets. Since then, importers of this solvent decided not to increase their approximately 15% share of the U.S. market (*CW, Dec. 24, '60, p. 73*).

But European polyethylene producers—now burdened with substantial idle capacity—are driving hard for

governmental action against U.S. competitors. PE prices have tumbled even faster in Europe than in the U.S. (*CW Market Newsletter, Aug. 12*); and European producers are unanimous and vehement in branding U.S. producers as the villains.

The British PE producers until last week had been considering making a joint application to the United Kingdom's Board of Trade for an antidumping order against U.S. shipments. Then ICI decided to go ahead on its own. But other chemical companies may offer various kinds of backing. Monsanto Chemical Ltd., for example, told CHEMICAL WEEK it would "support" ICI's application.

French producers of chemicals and plastics—bitter because they feel they don't have as much tariff and antidumping protection as their U.S. competitors enjoy—have been demanding that their government throw the book at importers of PE and ethylene glycol. Paris officials notified the U.S. embassy they were about to act against two U.S. producers of PE and one U.S. producer of ethylene glycol.

CW learns that while the other U.S. companies then adjusted their prices to avoid the penalty, Spencer—although it declared that it was "eager to cooperate" and proposed several plans for meeting French objections—responded mainly by trying to prove that it had not been selling PE at prices lower than those charged by French and other foreign producers. The ministry regarded this reply as "unsatisfactory," and applied the special tax that prices Spencer PE out of the French market. However, officials told Spencer the order can be annulled; and Spencer says it will try to get back into good standing as an importer, even though its share of the French PE market has been "very small."

With or without such actions, U.S. exports of PE are expected to decline as European producers develop their production and marketing know-how and their technical service programs. But the moves indicate that European industry is now highly resentful about big-volume, low-price imports; and that such resentment is likely to be reflected in policies of the important and growing European Common Market—which the U.S. will have to live with, one way or the other.

Pushing Free Trade

While the export tactics of U.S. chemical companies were stirring up bitterness in Europe (p. 21), "free traders" fired some heavy guns in the U.S. last week.

The Administration and many outside it believe that the Trade Agreements Act of 1934—which allows reciprocal tariff cuts on an item-by-item basis—is outmoded. It expires next year. Last week businessmen got a clear warning of what the Administration will fight to put in its place. The warning came in a speech by Under Secretary of State for Economic Affairs George Ball at the final session of the National Foreign Trade Convention in New York.

This country, Ball said, must follow the European example and throw open the whole economy to the rigors of international competition by adopting across-the-board tariff cuts, instead of the item-by-item cuts allowed under the present law. This is necessary, he said, to win a "broad-scale opening of the European market to our producers."

For the good of the U.S. economy, he added, we must not protect from world competition our inefficient, low-wage industries.

"Up to a certain limit of tolerance," individual industries and companies should bear the burden of the necessary adjustments that would have to be made, he said. But "exceptional cases" would get "exceptional treatment"—such as accelerated amortization of obsolescent machinery, modernization credits, worker retraining and relocating.



WIDE WORLD

Secretary Ball challenges U.S. business to live up to 'free competition.'

Meanwhile, former Secretary of State Christian Herter and former Under Secretary of State Will Clayton presented to a joint Congressional subcommittee a report calling for across-the-board tariff cuts and an "association" with the European Common Market as the only way to hold export markets.

But free-trade advocates face a stiff fight. Protectionist sentiment in the U.S. has been rising. Even Secretary Ball's trade-minded audience gave a polite but lukewarm reception to his speech. And the convention's final resolution, while it called for continuing Presidential authority to bargain for tariff cuts, skirted the critical issue of across-the-board vs. item-by-item cuts.

Barter Bogs Down

The future of a proposed fertilizer-for-burlap barter agreement between International Ore & Fertilizer Corp. (New York) and India's State Trading Corp. (CW Business Newsletter, Sept. 9) appeared in doubt this week as a result of a political wrangle that has developed in India.

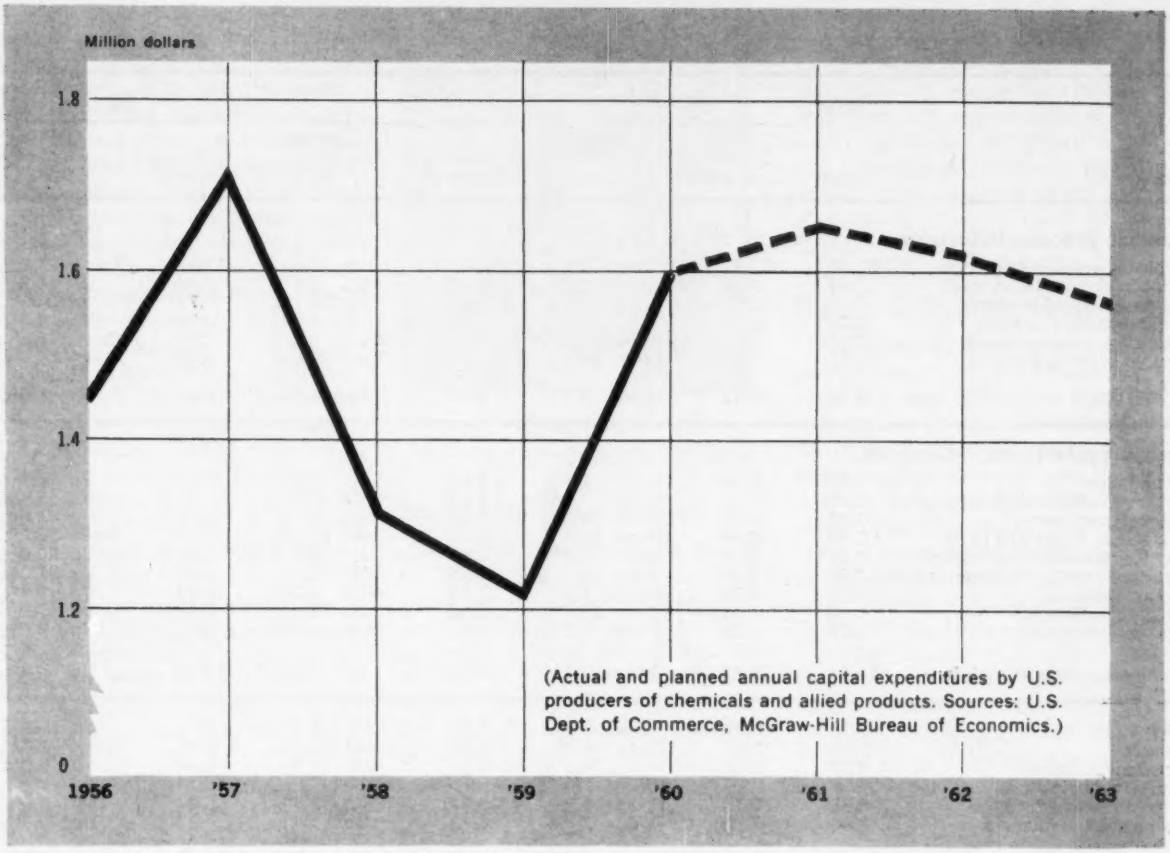
The three-year agreement calls for exchange of $18 million worth of fertilizer for an equal amount of jute. A minimum of $12 million worth of fertilizer and jute together would change hands each year. Part of the imported burlap would be used to bag the fertilizer that would be shopped to India.

Main cause of contention is an "additionality" clause stipulating that burlap goods imported into the U.S. under the barter would be in addition to regular commercial imports.

Opponents of the agreement—headed by jute distributors in the U.S., as well as members of the industry in India—feel that it would undermine the price of jute, eventually cause burlap to lose markets to other packaging materials. They say the agreement does not spell out what would be considered normal commercial imports and that it would be difficult to enforce.

At present State Trading Corp. is seeking to meet the objections that have been raised, but Interore says it has been given no assurance that the deal will be completed.

Chemical Industry's Capital Spending Passing Another Peak



Chemicals Buck Spending Trend

Unlike business as a whole, the chemical industry plans no boost in domestic capital spending in the next two years. Outlays, however, will remain high.

Increased capital spending and higher sales volumes—that's the outlook for U.S. business next year. McGraw-Hill's fall survey—out this week—shows that industry as a whole plans to invest 4% more in new plant and equipment during '62 than it did this year; sales should be up 7% (in physical volume). The chemical industry, however, does not expect to increase domestic capital spending next year.

But chemical companies are planning to keep capital budgets at a high level during the next two years, maintaining the '60 and '61 expenditure rate (*chart, above*). If the industry holds to this plan, it will be achieving a four-year capital-investment pace unparalleled for steadiness; annual fluctuations from the four-year average are no more than 2.5%. In contrast, the chemical industry's annual outlays during the preceding four years veered as much as 20% away from the '56-'59 average.

All other chemical process industries anticipate spending more on plant and equipment in '62 than they did this year (*table, p. 24*). Companies turning out products of petroleum and coal now contemplate a rise of more than 10% in next year's domestic investments. A slightly smaller increase is foreseen by rubber company managers.

Cutbacks in '61: In most industries, there was a distinct tendency to cut back expansion and modernization projects originally approved for this year. For example, CPI companies as a whole were planning to invest $6.31 billion during '61, as indicated by McGraw-Hill's 14th annual survey last spring (*CW, April 29, p. 21*). Now, as the year ends, it appears that the total will be about $6.12 billion. Most other industries also tightened budgets during the year.

On the other hand, company planners have raised '62 budget sights since last April, when the economic recovery was just starting to roll. Within the CPI, pulp and paper companies seem to be most determined to accelerate their '62-'63 expansion and modernization programs; they now

Capital Spending: Present Plans—and Changes Since April

(Dollar figures in billions. Sources: McGraw-Hill Dept. of Economics, U.S. Dept. of Commerce, Securities & Exchange Commission.)

Industry	1960 Actual	'61 Currently Estimated	'61 Change Since April	'62 Currently Planned	'62 Change Since April	'63 Currently Planned	'63 Change Since April
Chemical process industries							
Chemicals and allied products	$1.60	$1.65	Down 0.6%	$1.62	Up 2.5%	$1.57	Down 1.9%
Products of petroleum, coal	2.64	2.78	Down 2.5%	3.06	Up 6.2%	2.94	Up 4.2%
Pulp, paper, allied products	0.75	0.72	Up 5.9%	0.76	Up 26.7%	0.77	Up 26.2%
Rubber and misc. plastics	0.23	0.22	0 %	0.24	Up 4.3%	0.26	Up 8.3%
Stone, clay, glass products	0.62	0.49	Down 16.9%	0.53	Down 3.6%	0.53	Down 3.6%
Primary nonferrous metals	0.31	0.26	Down 16.1%	0.28	Down 20.0%	0.35	Down 14.6%
CPI totals	**6.15**	**6.12**	**Down 3.0%**	**6.49**	**Up 4.8%**	**6.42**	**Down 0.8%**
Other manufacturing industries							
Iron and steel	1.60	1.16	Down 1.7%	1.33	0 %	1.21	Up 16.3%
Machinery (except electrical)	1.10	1.10	Down 3.5%	1.17	Up 7.3%	1.17	Up 5.4%
Electrical machinery	0.68	0.68	Down 6.8%	0.62	Down 6.1%	0.63	Up 1.6%
Auto, trucks, buses and parts	0.89	0.68	Down 32.7%	0.70	Down 30.0%	0.74	Down 36.2%
Other transportation equipment	0.42	0.39	Down 2.5%	0.42	Up 27.3%	0.36	Up 20.0%
Fabricated metals, instruments	0.95	0.90	Up 25.0%	1.06	Up 41.3%	0.99	Up 21.0%
Food and beverages	0.92	0.98	Down 1.0%	1.04	Up 7.2%	0.93	Up 9.4%
Textile-mill products	0.53	0.51	Up 30.8%	0.56	Up 51.4%	0.53	Up 47.2%
Misc. manufacturing	1.24	1.17	Down 4.1%	1.20	Down 2.4%	1.21	Up 8.0%
All-manufacturing totals	**14.48**	**13.69**	**Down 2.8%**	**14.59**	**Up 4.8%**	**14.19**	**Up 4.3%**
Mining	0.99	0.99	Down 3.9%	0.99	Up 5.3%	0.94	Up 6.8%
Railroads	1.03	0.63	Down 8.7%	0.64	Down 11.1%	0.70	Down 1.4%
Other transportation and communications	5.07	5.02	Up 4.6%	5.03	Up 10.3%	4.84	Up 9.0%
Electric and gas utilities	5.68	5.75	Down 6.2%	5.87	Up 2.3%	5.97	Up 2.6%
Commercial and financial	8.44	8.38	Down 2.7%	8.72	Up 5.4%	7.85	Up 3.2%
All-business totals	**35.69**	**34.46**	**Down 2.5%**	**35.84**	**Up 4.9%**	**34.49**	**Up 4.3%**

plan to spend 25% more in those years than they had planned just seven months ago. Producers of nonferrous metals, however, seem to have decided that their building plans of last April needed considerable pruning.

New Boost Coming: Textile companies — comprising a major market for chemical products — have advanced their '62-'63 spending plans about 50% since last April. Some of these companies reported their new programs after the Treasury Dept.'s recent move to liberalize tax write-off provisions for the textile industry (*CW Washington Newsletter, Oct. 12*). But McGraw-Hill economists who conducted the survey think that new depreciation regulation was not a factor in the textile companies' decisions to boost capital budgets 50%. When that new regulation comes into regular use, they predict, textile capital spending may go even higher.

Food and beverage producers—another big market for specialty chemicals — indicate that next year their capital expenditures will hit $1 billion for the first time.

How much price inflation is included in current plans for capital spending? Executives in every industry expect to pay higher prices for capital goods next year, but their estimates on the amount of increase in such prices range from 1% to 4.5%, average about 2.6%. Chemical company managers think that price tags on their equipment will move up 2.1% next year.

Recovery to Continue: In every industry, management is counting on significantly higher sales next year. Estimates of increases in physical sales volume range from 2% by makers of petroleum and coal products to 9% by producers of nonferrous metals. Eight-percent sales gains are expected by rubber companies and makers of stone, clay and glass products.

Chemical industry management anticipates a 7% rise in sales in '62. Pulp and paper companies are figuring on a 6% increase in tonnage sales.

Nearly every manufacturing industry reports a substantial climb in operating rates since last December, when the recession was nearing its bottoming-out phase. But no industry was close to its preferred operating rate in September. Chemical companies, for example, estimated that their average operating rate rose from 75% of capacity last December to 79% in September — but they specify 93% as their preferred rate. Over-all, manufacturers operated at 77% of capacity at year-end, 81% in September.

How each industry plans to split '62-'65 spending between expansion and modernization will be taken up in the annual survey next April.

Canada Taps Helium

International Helium (Toronto)—aiming at producing Canada's first helium within the next few years—last week completed its initial financing. Only one other Canadian company has expressed interest in helium, and the U.S. is now paying Oklahoma and Texas producers to extract and conserve the gas. This means that International has only to develop long-term domestic and export customers to make extraction worthwhile.

Recently organized by a group of industrialists, International last week marketed 500,000 shares of common stock to raise $625,000. Licensed by Linde AG. (Wiesbaden, Germany), the company proposes to construct a $1-million plant capable of extracting helium at a rate of 77-million cu.ft./-day—cost: $9/million cu.ft.—from a stream of nitrogen and other nonhydrocarbon gases. The plant will be built at International's Wood Mountain well—purchased from Texaco—near Swift Current, Sask, output from which runs about 1.1% helium.

Only potential competition now in sight is British-American Oil (Toronto), which has a 2% helium well 70 miles north of Wood Mountain.

With the world price for helium at about $40/million cu.ft., International figures it can make a sizable profit.

More Chlorine Coming

Chlorine-caustic production is still increasing; two more expansions are now on paper.

A $1-million expansion of Hooker Chemical's North Vancouver, B.C., plant continues the step-up of chlorine-caustic output in Canada (*CW, Oct. 21, p. 22*). Construction should begin in a few months, and most of the output will go to the pulp and paper industry.

General Aniline & Film has firmed up additional details on its chlorine-caustic expansion at Linden, N. J. (*CW Business Newsletter, May 20*). Expenditure of $10-15 million will boost chlorine capacity 50 tons/day to a new maximum of 230 tons/day. Vickers Krebs (Montreal) is the major contractor. Construction schedule calls for start in December and completion in early '63. GAF's Antara Chemicals Division will manage production and marketing.



Monsanto's Smith: Named to executive committee of Italian affiliate.

Building Up Abroad

Monsanto Chemical Co. (St. Louis) has taken three new steps to build up its overseas operations. The company has transferred one of its vice-presidents to Milan, Italy, to head its interests in Sicedison, S.p.A.; revamped its European organization; and formed a new holding company for overseas interests.

Irving C. Smith, formerly vice-president of planning and control, and chairman of the budget committee at Monsanto, is taking over as deputy managing director and member of the executive committee with Sicedison.

Sicedison, second-largest chemical company in Italy, produces organic and inorganic chemicals, plastics and petrochemicals. Since Monsanto upped its interest in the company to 40% (from a reported 13%) in '59, Sicedison has added facilities to manufacture phenol and maleic anhydride, and expanded capacity for producing styrene monomer and polystyrene.

Monsanto recently consolidated its European operations when Monsanto Overseas, S. A.—a wholly owned subsidiary—established Continental headquarters in Geneva, Switzerland. Objective: "To strengthen its long-term sales, technical and investment position in Western Europe."

One reason for locating the new headquarters in Geneva: to be near the research center operated by Monsanto Research, S. A., in Zurich. This center, which has paved the way for much of the company's expansion in Europe since it was established in '56, is wholly owned by MOSA.

Another step with overseas implications: Monsanto Service Co. has filed articles of incorporation in Delaware. Principal purpose listed: to hold stocks, bonds and debentures in foreign corporations. Company officials say only that the new firm will "support the work of overseas subsidiaries."

Second Suit on Safi

New political complications cropped up last week in the legal battle over plans to build a $50-million fertilizer complex at Safi, Morocco (CW, Oct. 21, p. 22). Istiqlal, the dominant political party in Morocco, says it will institute proceedings against Dorr-Oliver, Inc. (Stamford, Conn.) for "allegations contained in a report by its vice-president and published by the press, allegations susceptible of injuring the dignity of the Istiqlal party."

Istiqlal has also filed a libel suit against *Avant Garde*, organ of the opposition Moroccan Labor party, for publishing the report, which alleged that there were irregularities in awarding Safi contracts. The trial has been recessed to Nov. 28 to allow key witnesses to appear.

The report, written by Dorr-Oliver Vice-President Douglas Reybold, said that a German promoter active in the negotiations had demanded a commission of 1.5% to be split among six individuals, and 10% to be deposited in a Swiss bank, supposedly for the Istiqlal party.

A spokesman for Dorr-Oliver tells CHEMICAL WEEK he has not heard of the suit against his company, but points out that the report did not accuse Istiqlal of seeking graft; it merely recounted the German promoter's demand. Dorr-Oliver maintains its report was completely factual.

It is understood that Reybold would be available to testify in the *Avant Garde* case, but only to verify statements made in the report or to answer technical questions about his company's bid.

Meanwhile, Dorr-Oliver says its original bid will continue to stand until it is rejected or until the Moroccan government asks that bids be withdrawn.

national roundup

Companies

New Surpass Petrochemicals (Toronto) has reportedly failed in its attempt to sell out to its major customer. NSP Vice-President W. H. Irwin has confirmed that 80% of the firm's stockholders have accepted the 46¢/share offer (market price for the stock has been in the 30-40¢ range for the past few months) but that owners of the remaining 20% either did not reply or refused the offer. The company will continue to operate at least until late '62 to fulfill commitments on its products: lithium-base greases, corrosion inhibitors, additives and petroleum sulfonates.

Miles Laboratories (Elkhart, Ind.) shareholders will meet early in January to vote on a proposal to triple the number of the firm's authorized shares from 2 million to 6 million. The directors have already approved a three-for-one split. Planned: a 200% stock distribution with par value remaining at $2/share. An extra year-end dividend of 36¢/share was also declared, which when added to the regular 12¢/share monthly dividend will bring total '61 distribution to $1.80/share, compared with $1.50 in '60.

Expansion

Film: Novamont (New York) will add a polypropylene film plant at its Neal, W.Va., site. Now being designed in Italy, the plant will be completed in early '63. Expected capacity: more than 1 million lbs./-month (*CW, Feb. 25, p. 23*). Novamont — wholly owned by Italy's Montecatini — started up its polypropylene resin plant at Neal last week and is adding a polypropylene fiber plant at the same site.

Expandable Plastics: Koppers Co. (Pittsburgh) will increase production capacity 85% at its Dylite expandable polystyrene plastic unit at Kobuta, Pa. The new facilities will be onstream by the end of this year. Dylite is a light foam plastic used for low-temperature insulation, packaging, flotation and construction.

Aluminates, Pigments: J. M. Huber Corp. (New York) is expanding sodium silico-aluminate capacity at its Havre de Grace, Md., plant. Also under construction: production facilities for "improved" hydrated silicic acid intended for use in rubber, paper, pesticides and paints.

Potash: Bonneville Ltd. (Wendover, Utah) plans further expansion of potassium chloride capacity. This round is equal to or larger than last year's 25% expansion, which upped production to the 100,000-tons/-year mark (*CW, Aug. 20, '60*). In addition to increasing the length of the brine ditches—which tap ground water pregnant with brine (about 1% KCl), improvements in the mill itself will be necessary.

Ammonia: American Oil Co. (Chicago) will construct what it calls a "large" anhydrous ammonia plant at Texas City, Tex., to increase the supply to its affiliate, Tuloma Gas Products Co. (Tulsa, Okla.). Additional construction planned: two new storage terminals, enlargement of another, and refrigerated barges. Both companies, are wholly owned subsidiaries of Standard Oil Co. (Indiana). Industry sources are estimating the size of the proposed new ammonia plant as 300-400 tons/day.

Veterinary Drug: Merck & Co. (Rahway, N.J.) will expand its Rahway plant with a multimillion-dollar unit to make Thibenzole (thiabendazole). The drug was developed by Merck to combat gastrointestinal parasites in livestock.

foreign roundup

Polyisobutylene/United Kingdom: W. R. Grace & Co.'s Overseas Chemical Division will build the U.K.'s first polyisobutylene plant at Baglan Bay, South Wales. It's scheduled for completion by end of '62. Capacity: 8 million lbs./year.

Petroleum Products U.K.: Texaco (New York) plans to build an 80,000-100,000 bbls./day petroleum refinery in the U.K. The plant will be 50%-owned by Texaco and 50% by Caltex, which in turn is owned 50-50 by Texaco and Standard Oil Co. of California.

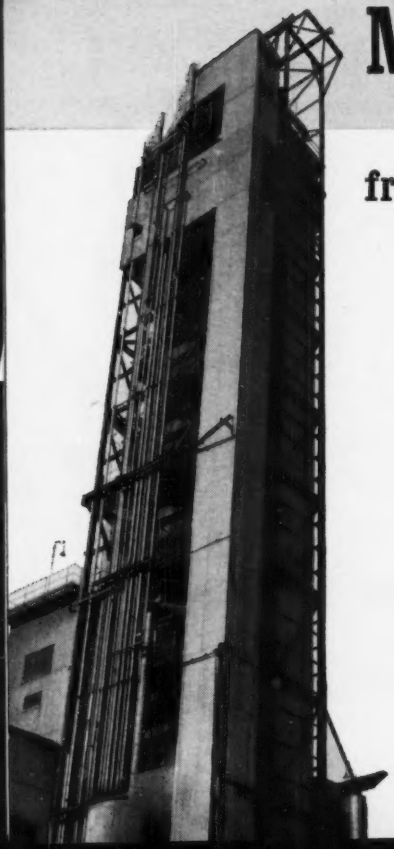
Fertilizer/U.K.: Fisons, Ltd. (London) reports that its chemical fertilizer sales dropped to $10.1 million from last year's total of $12.6 million. Main reasons: cuts in fertilizer prices, and unusually large fertilizer sales in '59-'60.

Chemicals/Germany: The Assn. of German Chemical Industry has predicted that German chemical investments in '61 will total $500 million, compared with $550 million last year.

Tetrachloride, Fluorocarbons/Australia: Imperial Chemical Industries will build a $2.8-million carbon tetrachloride plant at Botany, N.S.W., to be onstream by the end of '62. Some of the output will go to two new concerns, Australian Fluorine Chemicals and Pacific Chemicals, for use in production of chlorofluorocarbons.



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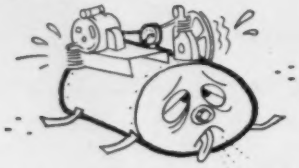
ONE OF A SERIES OF CHATS ABOUT THE CONSERVATION AND CONTROL OF HEAT

SARCO TOPICS

PREVENTION OF CRUELTY TO OLD COMPRESSORS

You've got at least one air compressor, of course. Doesn't everybody? And there it sits, pumping its heart out for you year in and year out. And you there, Simon Legree, do you ever give it a break and measure its capacity?

One measure is the useful work done by your compressed air tools, of course. However, this yard stick may make your compressor installation seem way oversize, but don't blame the equipment. The puffing oldster isn't responsible for choked intake filters, poorly designed suction pipes,



overcooling, undercooling, inadequate distribution mains and wet air. All these things can cost you.

Off and on we're going to talk about compressors in these pages, if you don't mind. It's a big subject and the lesson for today will be confined to the air intake. Can you imagine a more logical place to start?

Where to locate the intake? Easy. Where the atmosphere is clean and cool and dry. Dirty air and grit choke filters and eventually get through to cause wear. The cooler the air, the more you can compress per revolution. You'll get 10% more air delivered at 40°F. than at 90°F. And dryness is imperative, because compressed air can't contain all the moisture it can hold in its uncompressed state. Where does the moisture go? Into mains, tools, and valves, unless it's removed. And need we add that chemical fumes cause corrosion? That includes exhaust gases from engines and furnaces. CO_2 in the presence of oxygen and moisture can rust your valves, tools, nozzles and sprays.

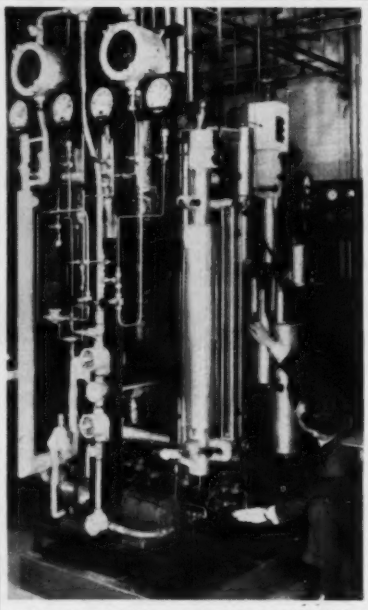
How about intake size? Keep pipes short, sized right, and straight as possible. Small pipes with snaky bends reduce pressure and capacity. For an educated example, a pressure loss due to friction in the intake pipe and filter of 2 psi (14.7 to 12.7) will reduce output of a 125 psi compressor by 7.5%.

How do we know so much? Well, as we continue in future issues, we'll be talking drains and traps and cooling and safety controls for compressors—all of which we manufacture. That's how we know so much. If you can't bear to wait, just write. It's that easy to get information out of us.

SARCO AND THE FLYING DUTCHMAN

In the pipe shop of a major office building complex on New York's east side, the Flying Dutchman flies again. This is really a bright idea which could well become standard practice elsewhere, because it's the kind of logical precaution that would make sense anywhere.

The chap in our photograph is putting together, according to precise, dimensioned drawings, an assembly consisting of a Sarco Thermo-Dynamic Steam Trap, Type TD-50, a Sarco strainer, and valves and fittings for stock. The assemblies will be used for quick and easy replacement in the event of failure or any possible maintenance requirement in the steam distribution system, the heating system, or the air conditioning system.



WORLD'S LARGEST ESPRESSO MACHINE?

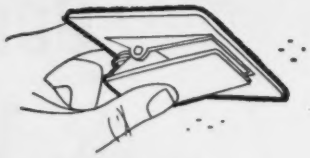
No indeedy. It's a pilot plant Hydrofiner unit built by The Lummus Company at its Engineering Development Center in Newark, New Jersey. And its presence here is due to the fifteen ⅜" Sarco Thermo-Dynamic Steam Traps which vent and drain its 35 pound tracer lines plus a ½" TD-50 as a main drip. Nice to be picked for projects like this. Makes us proud.



We'd like to be able to report that this plan recently saved thousands of people from freezing or roasting during a crisis. So far, however, the assemblies have proved to be an ornamental kind of insurance policy. Alas, there have been no failures. That dog-goned Sarco performance is just too reliable for its own good.

WE'VE GOT THINGS TO GIVE AWAY

First of all, we have a new spring clip to hold together a bunch of papers on your desk, or something. It's not complicated, but it *is* difficult to describe, so we've gone to the tremendous expense of having our local Michaelangelo sketch it here. If you have no papers to hold together, it makes a rather delightful snapping noise that might amuse you. Oh yes—it also has a cross section of a TD-50 steam trap printed on it which actually *moves* when you wiggle your eyeballs at it. In case you *still* don't know how a TD-50 works, this is for you.



Second, we've still got engineers' sketch pads which we enjoy giving away so much we're offering them again. In case you're new here (Hello!) they contain isometric grid paper for use by anyone involved in piping or hookup sketches for process or heating applications.

And the famous Sarco key chain, which is really exactly that—a chain—about 60 times as handy as a fat case, we're offering again too. This has a TD-50 replica attached, but detachable. Call it tawdry promotion if you will, but our super-aesthetic wife wears one proudly around her neck.

All of these are available from your Sarco representative. Or, if he's out, write in.

There's really no reason to keep this conversation one-sided. After all, we're both interested in these subjects or you wouldn't have read this far. So write, even if it's only about a difficult problem. 7826

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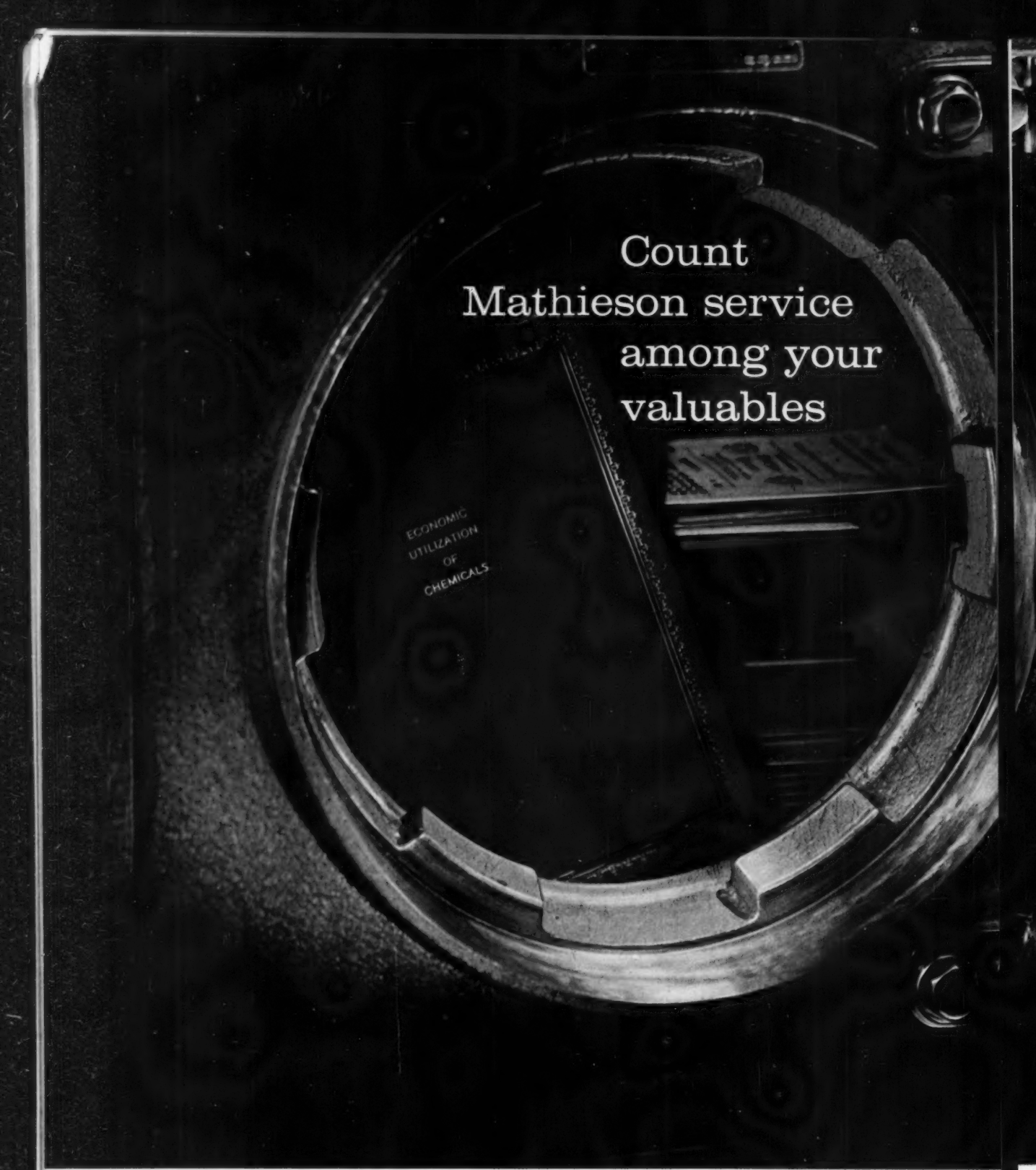


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8 CASES IN POINT...

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CHEMICAL WEEK
November 11, 1961

Lower rubber prices apparently are here to stay. This is virtually assured by a new rubber-disposal plan of the General Services Administration, which manages the bulk of the nation's stockpiled materials. In recent months rubber has been selling for nearly 30¢/lb. The price dropped to 27-28¢ recently after the British revealed they would increase their monthly sales of stockpiled rubber by 1,000 long tons.

GSA is, in effect, following the British lead. It will sell unlimited amounts of rubber from its stockpile if the market price hits 32¢/lb. The previous floor for unlimited sales was 36¢. At less than 32¢/lb. GSA will sell 5,000 l.t./month. If, after a period of time, GSA has sold 15,000 tons at 28¢ or less it will examine the situation to determine if it wishes to keep selling at the lower price. But it makes no promise to stop such sales. Previously, it automatically halted sales when the market price dropped below 30¢.

The amount of rubber in the GSA stockpile is secret. But the government had an estimated 1.2 million l.t. when the disposal program was started in Oct. '59. Since then, GSA has sold 119,293 l.t. Sales in the last four months have totaled 9,204 l.t.

•

The $102-million budget cut at HEW will have little effect on present programs. The bulk of the reduction cited by Health, Education & Welfare Secretary Abraham Ribicoff will be achieved by not filling 627 new jobs authorized in the current fiscal year. In addition, some research grants planned by the National Institutes of Health may be curtailed—but to no significant extent and almost completely in proposed program expansions. Officials emphasize that current programs are not endangered.

•

Army Chemical Corps may lose some of its purchasing authority under a reorganization plan being studied by Defense Secretary Robert McNamara. The idea is to merge the contracting functions of the Army's technical services—Chemical Corps, Quartermaster Corps, Signal Corps, Corps of Engineers, Ordnance Corps and Medical Corps—into a new Army Logistics Command. Many of the same personnel would continue their present work, of course, but under the new unified command.

The move would be another step in the Kennedy Administration's drive to centralize control over the multibillion-dollar military procurement program. McNamara has already set up a Defense Supply Agency that will buy and manage all common-use, commercial-type goods and services for the military. But each of the services continues to buy major hardware items.

The Air Force has consolidated under a new Systems Command its procurement of arms and equipment that previously was handled by two different agencies. The proposed organizational overhaul of the Army's

supply program would be similar to that already put into effect by the Air Force. A decision on the proposal is expected shortly, with the odds favoring its acceptance.

•

Liquid fuels have a decided edge over solid fuels for moon-shoot rocketry, say most experts at National Aeronautics and Space Administration. No official decision along this line is likely to be announced in the near future, as research and development of engines using both types of fuel continues. But many feel that the decision has already been made—that solid fuels will wind up with a secondary role.

The situation may be clarified somewhat by a forthcoming report of a joint NASA-Air Force committee headed by Nicholas Golovin. This group will recommend the quickest, easiest and cheapest way to reach the moon. This, in the minds of most experts, is through the use of liquid fuels —chiefly because they are in a more advanced stage of development than solids and because of their weight advantage. Under any circumstances, upper stages of rockets will continue to rely on liquid hydrogen and oxygen and kerosene, the chemicals involved in the Nova. Air Force work with solids is considered a backstop.

•

Internal dissention in District 50, which claims to be the largest labor union in the chemical industry, has cast considerable doubt on its future leadership. President A. D. Lewis and his one-time certain successor, Vice-President Elwood Moffett, have been at odds since early this year when they tangled over District 50's relationship with the parent United Mine Workers, a union it has long since outgrown.

Lewis, brother of UMW President-emeritus John L. Lewis, had wanted to break cleanly from UMW and convert District 50 into a truly independent union. However, Moffett and UMW attorneys won their argument that District 50 remain closely aligned with UMW. A. D. Lewis, seriously ill, has left the operation of District 50 to Moffett. But the Lewis-Moffett division is still widening, leaving eventual control of District 50 in serious doubt.

•

AEC is withdrawing as a supplier of plutonium-beryllium neutron sources, leaving the field open to commercial suppliers. The only firm with a license to produce the neutron sources at present is Nuclear Materials and Equipment Corp. (Apollo, Pa.), but Monsanto is expected to apply for such a permit for its unit at Dayton, O. Monsanto operated Mound Laboratory—previously sole supplier—at Miamisburg, O., for the Atomic Energy Commission.

The move is in line with AEC's policy of discontinuing the provision of materials and services readily available from commercial sources at reasonable prices. Plutonium-beryllium neutron sources are used in basic physical studies, in medical and biological research, in geological oil surveys, in starting atomic reactors and in operating subcritical reactors.



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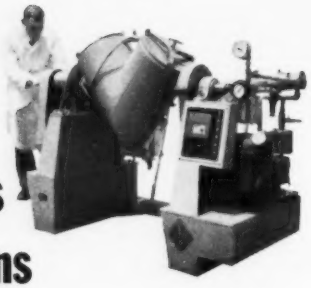


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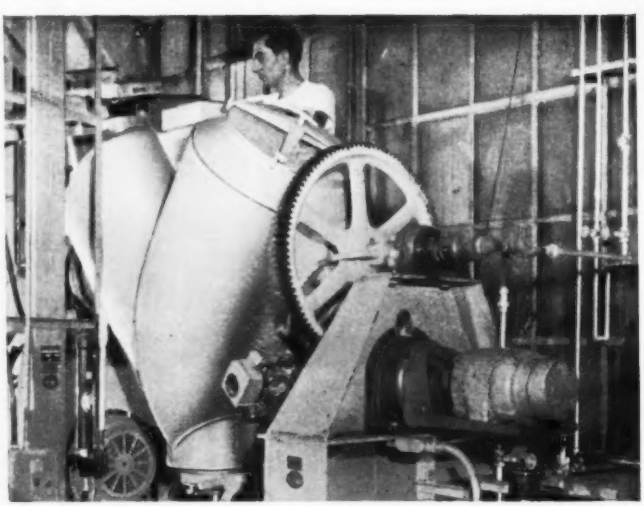
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California Chemical's Powell: Now marketing is the prime mover.

For More Marketing Muscle

In the beginning, research was the prime mover of the chemical industries. Then came production—and now it's marketing. That's the thinking that motivated California Chemical Co.'s (Standard Oil Co. of California) new realignment of top management personnel. It's a move, says Calchem President Fred Powell, to put more muscle into marketing.

Men with strong marketing experience now have the commanding voice in the firm's major decisions.

The realignment of top management changed job titles extensively in the Oronite and Ortho divisions, which together provide about 10% of Calso sales and a considerably higher share of the company's profits. Because of different sets of problems, however, the reorganization takes a different shape in each case. For the Oronite Division, the main move is in personnel, but for Ortho there will be a reorganization of line and staff functions.

Major in Marketing: The move that most clearly points up the new emphasis in marketing of chemicals is the appointment of T. G. Hughes, longtime president of Oronite Division, as vice-president of marketing (a new post) of California Chemical. Hughes' successor as president of Oronite is Theodore Welton, formerly Oronite's manager of marketing.

Hughes feels that the future success of California Chemical rests on its marketing organization—whether the company comes out with new products or enters already-competitive markets. "Competitive marketing situations will carry a great deal of weight in our future direction," Hughes says, adding that the company has no intention of getting into product lines simply because it has the manufacturing facilities for them.

Price Reverence: "With plant capacities climbing," Hughes says, "and the markets climbing not as fast, somebody will be left in the cold. The only way to sell is to know your products and markets thoroughly and to make a contribution to the industry, not by cutting prices."

Underlying the intensity of feeling on this subject is the position in which California Chemical now finds itself concerning several of its major products. For example, last week's price reduction in phthalic anhydride (*CW Market Newsletter, Oct. 28*) came shortly after the company's disclosure (in August) that it intended to build a 30-million-lbs./year phthalic plant in Perth Amboy, N.J. Further, California Chemical's extensive overseas business in *o*-xylene appears threatened by prospects of lower prices, and its phenol and maleic business both face weak markets characterized by overcapacity.

Welton echoes Hughes' sentiments,

Ortho's Wierenga: Becoming national in ag chemicals with a new setup.



Oronite's Welton: His move to top division reflects shift in emphasis.

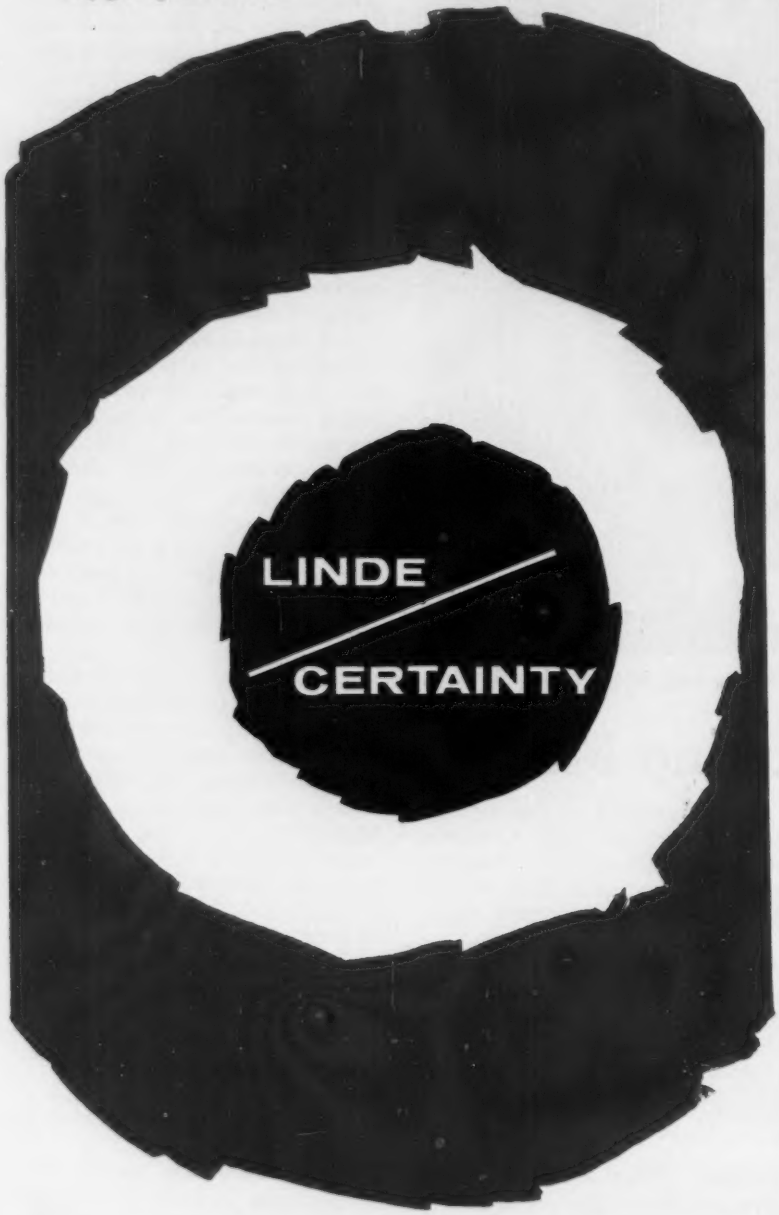


California Chemical's Hughes: His new post, vice-president of marketing.



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says he never knew of a special cut-rate price that didn't spread throughout the industry. "In effect," he says, "such prices serve no other function than forcing the general price lower. In very few cases do cut-rate prices increase the total market; they only make it harder for a producer to show a profit."

Two Roads to Marketing: Welton, in his new position at Oronite, has a ready-made "marketing" organization with which to tackle the problems of pricing, overcapacity, new competition, and the like. It is largely the staff Hughes had, with many of the men advancing a step in the management line.

At Ortho, the agricultural chemicals division, however, a more complete reorganization was needed.

It has been primarily a job of freeing selling staffers from sideline tasks so they could concentrate on the problems of their highly competitive field. And these problems will be intensified soon, when Ortho's $22-million nitrogen complex at Fort Madison, Ia., comes onstream. This will put the company squarely into a new (for it) and highly competitive national fertilizer market.

Under Ortho's previous organization plan, the district managers (all of whom are essentially sales people) would have faced this task burdened with such auxiliary jobs as market research, operations and product development. The new plan places these functions under a marketing staff at the company's Richmond, Calif., headquarters, leaving the line people free to concentrate on their selling assignments.

The new scheme thus replaces a regional concept with a national concept, creating a nationwide-oriented marketing organization under M. E. Wierenga, Ortho vice-president and manager of marketing. Reporting to him are C. E. Cody, national sales manager of agricultural products, immediate boss of the newly consolidated sales districts. He is responsible for keeping district operations efficient and economical.

Traffic Problems: Ortho also created the post of supply and distribution manager, appointed F. J. Juchter, formerly Ortho's vice-president in charge of manufacturing. He will concentrate on Ortho activities in three prime areas: traffic, purchasing and distri-

bution. His job: to determine the best and most economical methods of storing and moving materials, selecting necessary facilities, devising inventory controls, handling product exchanges, developing product balance controls.

On the national staff, different men are responsible for different functions —some horizontal, some vertical. One man, for example, is in charge of most marketing activities for pesticides. Another, in charge of agronomy, handles testing and demonstrations, contacts universities and government agencies and translates test results into usable sales materials.

Another man heads the newly created Garden and Home Dept., split off from the agricultural product marketing offices. He has three regional sales managers (West, East and South), plus a national sales representative to deal with nationwide chains and mail-order stores. The regional managers have two responsibilities: sales and general conduct of business in their regions. But the national Garden and Home Dept. is free from all responsibilities except sales.

Other national staff functions: a product development and market research group; and an operations unit. The man heading the operations post is responsible for guiding district operations managers on inventory control, ordering and purchasing procedures, safety and maintenance policies, local formulations.

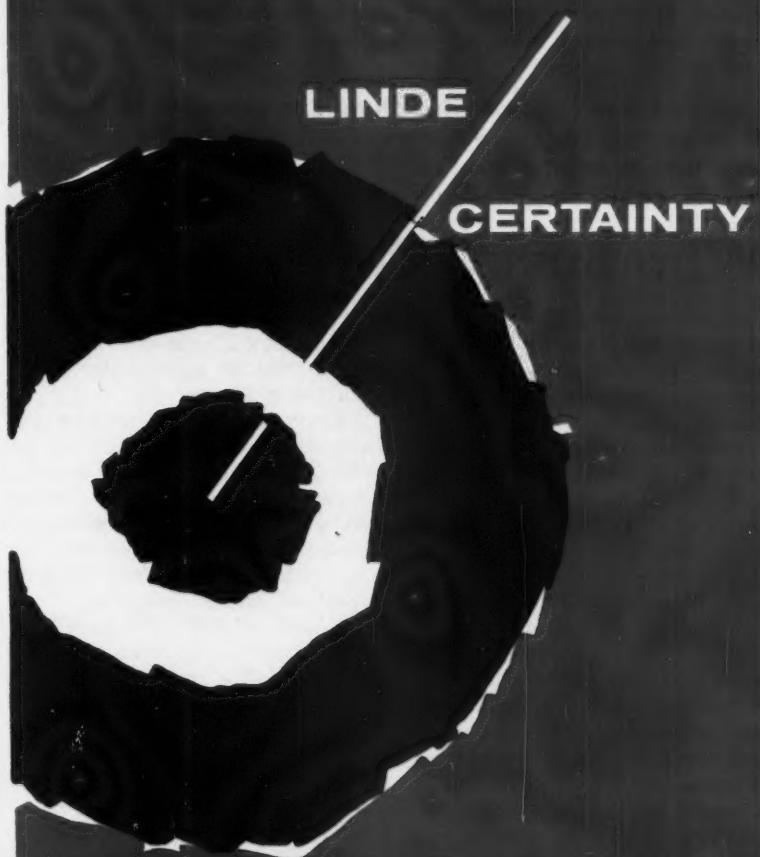
To Each His Own: The goal of this realignment is to stimulate sales and achieve distribution savings by separating the functions, putting a specialist at each job.

Under the new scheme, it is hoped, there will be time and personnel for planning, analysis and economic consideration and for strong supervision of both sales and operations.

Which way California Chemical turns depends to a great extent on how well Hughes can exploit the overall marketing capabilities of the company and of its division men, Welton and Wierenga. Standard Oil's new, $125-million refinery in Pascagoula, Miss., might play a large part in their plans, as may new products from the upgrading of established commodities —e.g., phthalic plasticizers and possibly polyolefins. In any case, it is a challenging application of the marketing concept.

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'The purchasing department is involved considerably less in purchases of equipment, machinery, of special and extraordinary services.'

'While headquarters still makes available a rigid code and set of manuals to adhere to in purchasing . . . very little attention is paid to these . . . rules.'

'Our methods of purchasing are very informal, and our purchasing agent in most cases is little more than a clerk, serving to expedite purchases.'

'For all new products, vendors call on the purchasing agent. If he sees something good, he contacts the department supervisor who might be able to use it.'

'While I make my own decisions, the selection is limited, to some degree, by an approved list provided by top management at headquarters.'

Who Buys What in the CPI

A just-completed Chemical Week survey of more than 200 executives in over 100 CPI companies across the nation has clarified purchasing patterns.

Two findings emerge strongly: (1) decentralization—local plant buying—of all but major purchases; (2) limitation of purchasing department authority to routine buying. But the exceptions are many, lending weight to the axiom that each customer requires a salesman's individual study.

In the broad study, executives at plants and home offices were asked to describe their buying process for products ranging from raw materials to capital goods. About 60% of those surveyed follow a plan of mixed centralization and decentralization. Almost invariably the dividing line comes between routine or minor purchases and capital goods. About 32% reported decentralization for virtually all purchasing. Only about 8% said that top management has to pass on minor purchases.

Decentralize—And Save: Perhaps the best reason for the popularity of decentralized buying is summed up by an executive at one of the few companies able to base its decisions on a cost analysis of purchasing operations: "We have changed our method of purchasing [use of a rigid code and set of manuals] to reduce costs. Previously, some 22¢ out of every dollar's worth purchased involved costs of the purchasing process."

Such companies try to keep top corporate management out of as many purchasing decisions as possible. A respondent from one such firm reports, "The headquarters office purchases only nominal office supplies; . . . each of the divisions has a separate and different procedure."

Control or Not? The study also shows, however, that even where decentralization is the rule, headquarters "controls" purchasing in a fashion by issuing manuals for local plant purchasing men to follow. Thus, the chemical subsidiary of an oil company receives buyers' guides, listing products approved either because of tested quality or—sometimes—reciprocity.

As a purchasing agent in another company reports, "While I make my own decisions, the selection is limited, to some degree, by an approved list provided by top management at headquarters, which narrows down the suppliers from whom purchases may be made. However, this does not entirely eliminate my freedom of choice from 'unapproved' local suppliers where other conditions warrant."

Generally, such approved supplier lists are kept flexible enough to allow for different local conditions, usually give more than one name for each product.

Even where the plan is to give routine buying decisions (or those below a certain cost level or degree of complexity) to local people, headquarters management reserves judgment for unusual—most often capital—goods.

About 74% of those surveyed, in fact, impose such limits. They range all the way from $25 to (in four cases) $1 million.

The standard procedure here is for the local foreman, engineer, or department manager to pass requests for materials on to the plant purchasing agent who places the order. If the order exceeds his limits of authority, the requisition is passed on to headquarters.

New Plant Decisions: Purchasing agents must also share their authority on equipment selection with home office technical departments. Says one company: "Engineering sets specifications and sometimes names brand and price. Purchasing plays a rather passive role in that they place the order and occasionally advise on prices."

Another variation of this influence: "Suppliers submit products to our laboratory for approval. After approval, the purchasing department takes over and attempts to make the best buy."

A paper maker splits its equipment purchasing authority and chemicals purchasing authority this way: "Equipment purchasing decisions are a cooperative decision between local levels and the headquarters staff engineering group. Chemicals are a combination of local purchasing levels and management in New York—basically a coordinated effort. Pulpwood and chips are handled 100% locally."

Hidden Limits: The way this authority is portioned out obviously varies a great deal. In some cases, local purchasing is held down by national contracts. Says one plant man: "National contracts cover many products, such as tires, certain paints, laboratory equipment, paper products, etc., negotiated by the company purchasing department. When needed, with department head approval, a request is made for purchase and an order placed with the contract supplier from the purchasing department at the plant. Other contracts are

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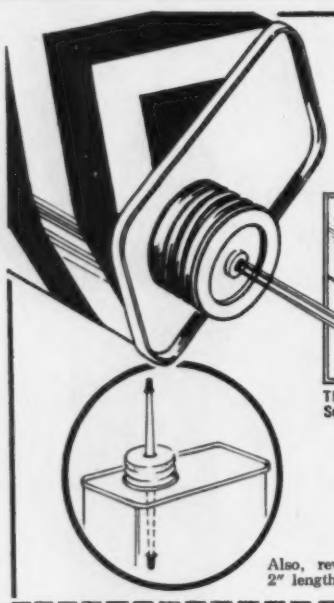
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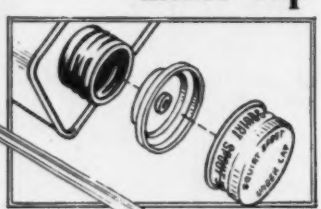
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negotiated divisionwise, and some purchases are made here."

Most often, the purchasing agents' most important buying influence is picking a source of supply, after the purchase and specification decisions have been made by others.

Another important function is to introduce new products to other people in the company. The way this works is described in one reply: "For all new products, vendors call on the purchasing agent. If he sees something good, he contacts the department supervisor who might be able to use it. If the supervisor can use it, he takes it to the plant superintendent who then takes it to the production manager. They then might order a small quantity and if it works out, he might become a regular user."

Automatic Orders: Frequently, on the other hand, purchasing becomes so automatic that much of it is done by IBM machine. Standard products are kept in inventory, which is controlled by the tabulating machines; when stocks go below a predetermined point, the machine automatically reorders. Setting of the machines is under control of either production or sales.

Small and Centralized: As indicated, a number of companies make no effort to decentralize the purchasing function.

This is frequently the case in the smaller companies. Typical is this small concern's description: "When we decide we need certain supplies and materials, we inquire to see which company handles the products. Then either the president or the secretary-treasurer sends the order to the supplier. This is a small manufacturing business and the officers exercise close control over all purchases."

As might be expected in small companies, the concentration of purchasing at the home office is a result of the business being tightly run by a management limited in depth. In other cases, centralization reflects the conviction that close control over purchasing must be kept for the good of the business, and that purchasing warrants employment of the most skilled men available.

Such a company would have, say, all purchases approved by its technical director, and where more than one supplier is felt necessary, each supplier's share of business is deter-

mined by the company's board of directors.

In one such company, a fairly large chemical concern, centralized purchasing works this way: For items that can be purchased in bulk, or used at other locations, requisitions are sent to division purchasing, which purchases in bulk. This unit is responsible for handling distribution to other locations. All raw materials fall into this category.

One firm points out limitations of this practice: "Corporate and division purchasing decide on how much business to give certain suppliers and this at times transcends plant purchasers' desire to obtain lower-priced merchandise or quicker service."

Informality Rules: Generally, the survey shows that many people are involved in purchasing, particularly of new, expensive, or unusual items. Much of this consultation is informal —in spite of the amount of attention recently spotlighted on formal purchasing committees, only 12% of those questioned reported having such a setup.

Frequently the pattern of action is sufficiently loose that respondents have trouble outlining it. Said one, "I guess we buy out of fright—when we see we are getting low, we buy."

Coast Docks Costlier

California ports will raise their dockage rates one-third by early next year, in line with recent recommendations of the California Assn. of Port Authorities. Most ports in the San Francisco Bay area will make the move on Dec. 1; however, southern California ports will probably wait until January.

The higher dockage rates are expected to bring in an additional $525,000 in revenues for '62. This, however, will only make a minor dent in the $8.5-million revenue deficit reported by all California ports last year.

The association also recommended increases in wharfage rates, but the state's port authorities were almost unanimous in turning down the suggestion. Wharfage levies run 20-75¢/ton, while dockage charges average about $175/day. Thus a wharfage increase would have made a large dent in the ports' deficits, according to association officials.

October 25, 1961

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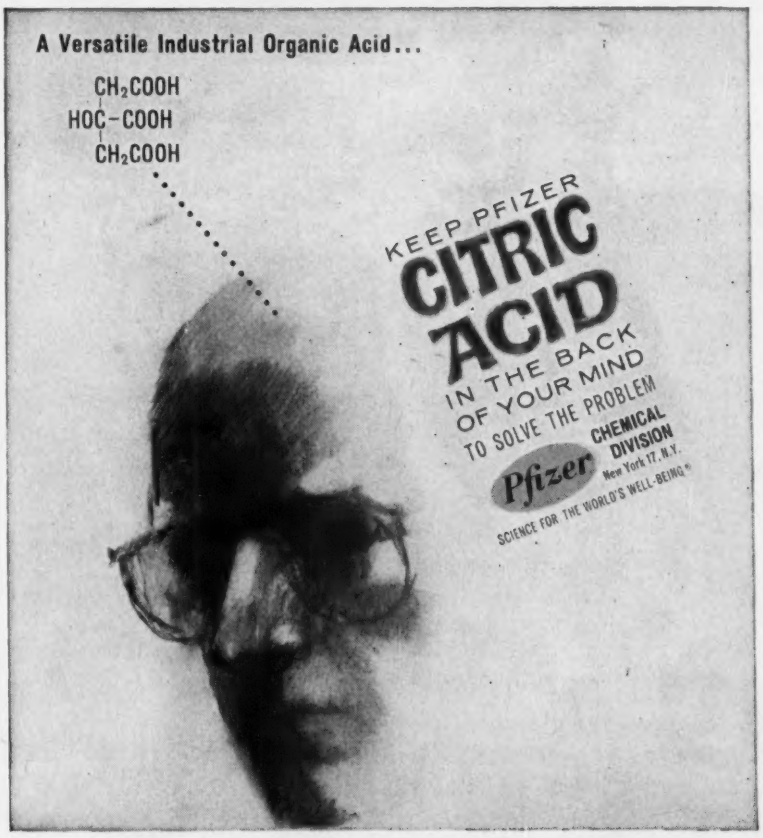
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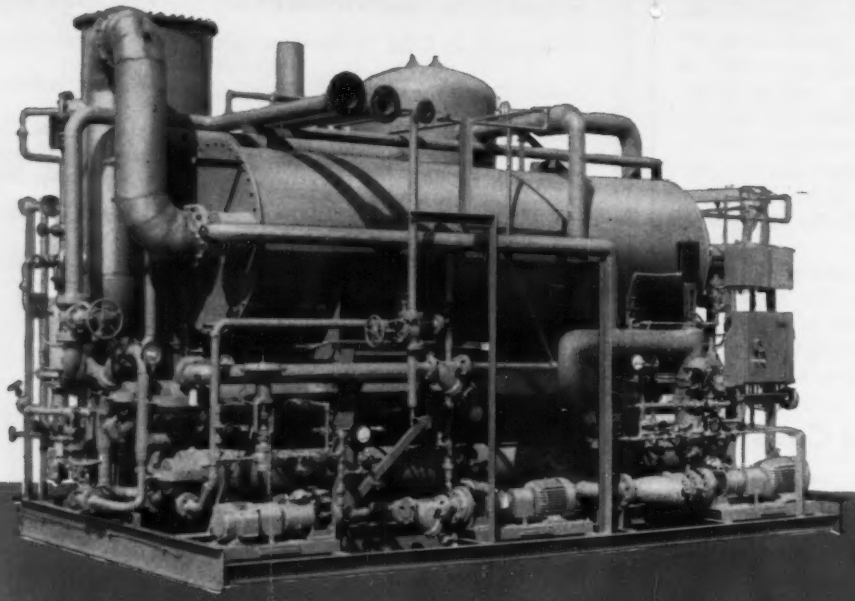
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Fansteel's Collinsworth leans on mathematics in management.

Figuring into New Profits

Last week Fansteel Metallurgical Corp. (North Chicago) voted a 3-for-2 stock split, boosted its quarterly dividend 5¢ on present shares, to 30¢ a share. The firm's leaner years, its new president, Even T. Collinsworth, Jr. (above) hopes, are behind it.

Within another decade, Fansteel expects to double and perhaps triple its current $30.8 million annual sales, meanwhile boosting net profit after taxes from an average 7% to its goal of 10% or more. Its four-part formula: (1) management reorganization; (2) heavy reliance on mathematical profit-evaluation methods; (3) new products; and (4) acquisitions.

Impetus for Fansteel's profit drive is supplied by Collinsworth and board chairman (former president) Frank Driggs. Collinsworth is former president of Velsicol Chemical and Carlon Products Co.

In appraising Fansteel's position in late '60, Collinsworth found "an accumulation of good and bad." On the plus side was the company's solid technical position in its four divisions. The Metals Products Division (since reorganized and renamed the Chemical and Metallurgical Division) was a pioneer in refractory metals (tantalum, columbium, tungsten, molybdenum) and also offered fabricated refractory metal products.

The Rectifier-Capacitor Division, the first to commercially make tantalum capacitors and silicon diodes, had a substantial business in fabrication of dc. rectified equipment. Electrical Contacts and Specialties Division was a leader in developing mass production methods for producing precision electric contacts and assemblies from refractory and precious metals. And the Vascoloy-Ramet Corp. subsidiary was well known in tungsten carbide metallurgy.

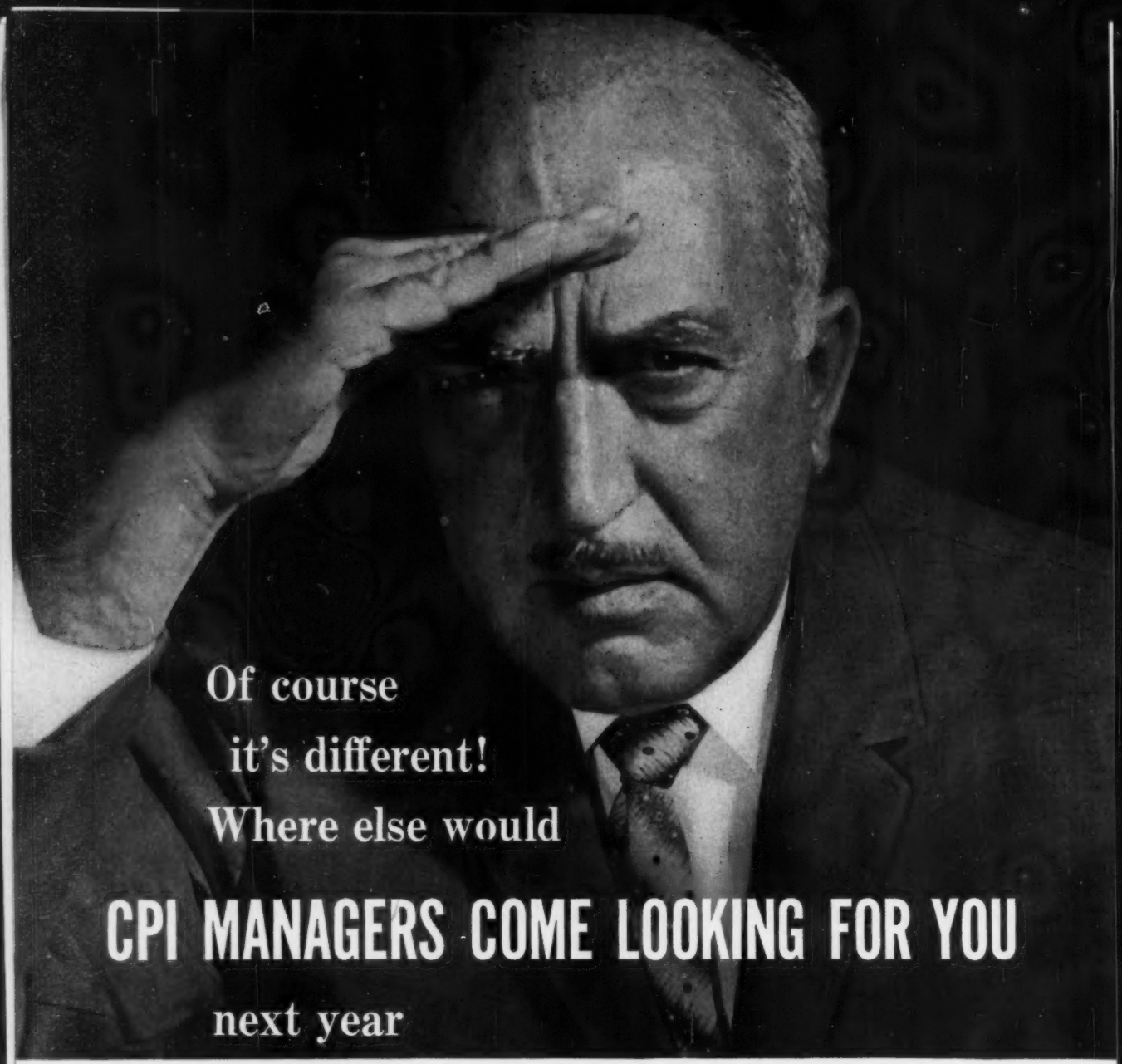
But Fansteel had a major problem. More often than not Fansteel was a "commercial second" in the marketplace. The company, for example, was the first to offer tantalum, tantalum capacitors, tantalum process equipment, and silicon diodes commercially, yet Fansteel did not and still does not have the dominant commercial position in any of these fields. Collinsworth's objective: keeping technical quality and the 'Cadillac attitude' while simultaneously commercially orienting Fansteel.

New Cast: In a sense, Driggs' hiring of Collinsworth marked the beginning of the Fansteel reorganization. The hiring of other key personnel soon followed. A new director of marketing, James Borendame, was brought into the company. Collinsworth also named Ralph Rawson general manager of the new Chemical and Metallurgical Division, which was formerly split among the Muskogee, Okla., division, the Fabrication Division, and the Chemical Division (both the latter in North Chicago).

These old divisions were small, included all the disadvantages of decentralization and none of the advantages. Communications were slow, and more inventory than necessary was carried. Fansteel now has one general manager instead of three, customer service communications are faster and inventories are down.

Math for Management: Fansteel has adopted the "cash discount" method for appraising proposed expenditures and uses Gompertz-Curve techniques for operational planning. Cash discount (*CW, May 30, '59, p. 41*) is a means of measuring investment return while taking into account the time value of money. It takes into account such factors as capital investment, operating costs to produce the sales, method of depreciation, and interest rates.

All proposed investments of more than $5,000 now get a detailed analysis. A project that wouldn't pay out within its expected obsolescence period would be rapidly flagged. Fansteel



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aims at 10% return on gross assets employed.

Product Know-how: Figuring prominently in the long-term profit goal are aggressive plans to capitalize on new products and now-unexploited know-how. Just a few weeks ago, Fansteel launched an electrical grade of sintered copper. It has properties comparable to wrought copper, claims Fansteel, and will permit cost savings of up to 10% on various applications such as electrical components and machined replacement parts.

The company is currently researching methods to clad steel with tantalum, using a Du Pont technique of explosive cladding. If problems can be solved, it could open another door to tantalum equipment in chemical processing operations.

Over the years Fansteel has acquired a background of know-how in powder metallurgy, high-vacuum sintering, refractory metal forming and joining, inorganic chemical processing and other areas. Many of these are not fully utilized, Collinsworth believes. The company has the technical capacity for extracting uranium, for example, producing nuclear fuels and manufacturing inorganic chemicals. Moreover, the company hopes to develop further uses for its powder purification knowledge, possibly put high vacuum know-how to work in stress-relieving through heat treatment of metal parts.

Like many CPI firms, Fansteel has a yearning to become basic on some of its major raw materials. The company now purchases molybdenum oxide and ammonium paratungstate as raw materials for molybdenum and tungsten. Currently the company is striving to develop an improved process for extracting tungsten from scheelite—a domestic ore that could offer cost advantages relative to extraction from imported wolframite, as well as a dependable source of supply in the event of a national emergency.

Merger Path? Acquisitions and joint ventures could play a major role in future corporate growth, says Collinsworth. Last March the firm acquired, for $6.3 million, Wesson Corp. (Ferndale and Brighton, Mich.), a fabricator of tungsten carbide tipped tools, to complement and broaden a line of similar items offered by Fansteel's Vascoloy-Ramet Division.

Fansteel, states Collinsworth, is



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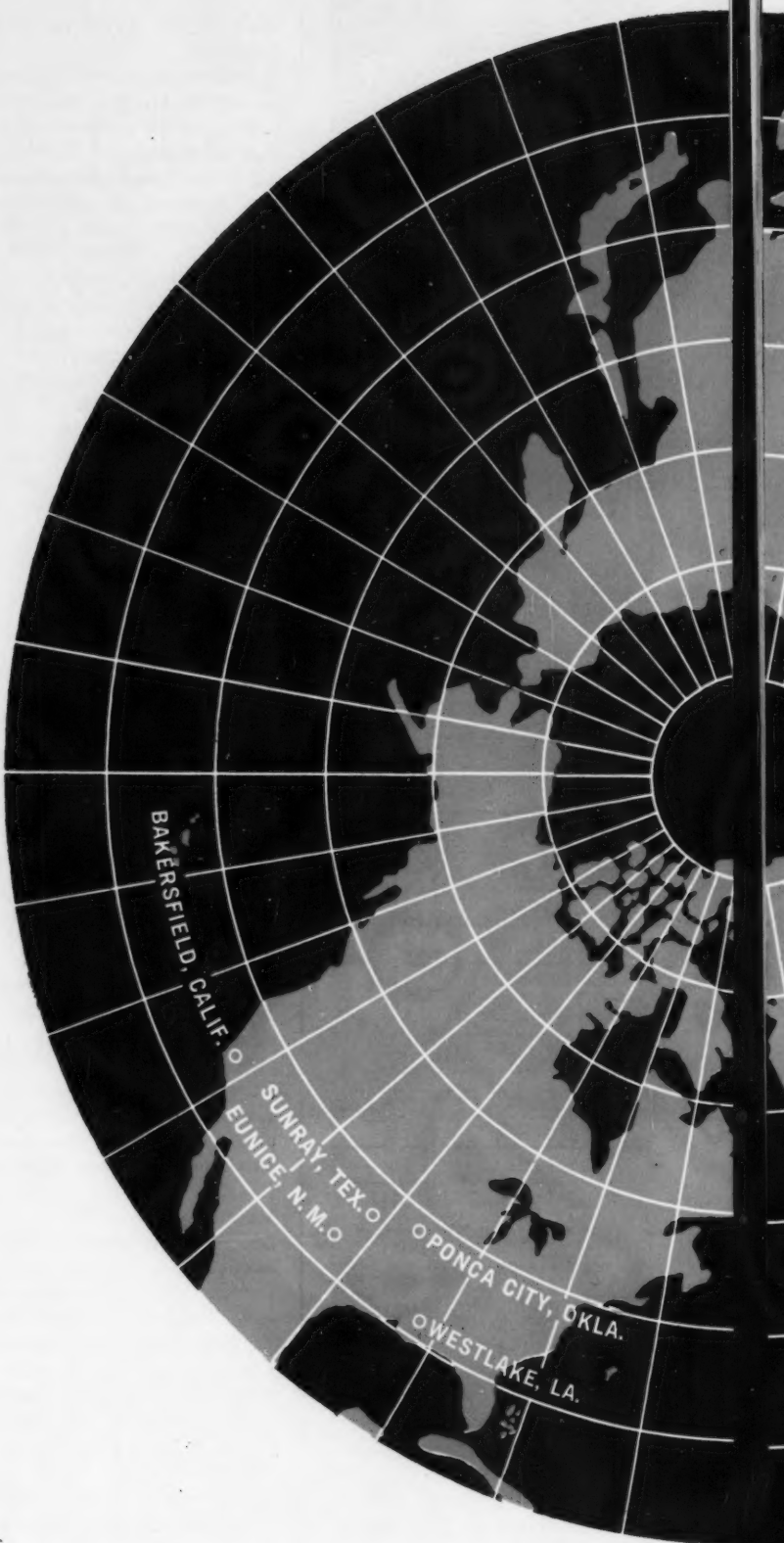
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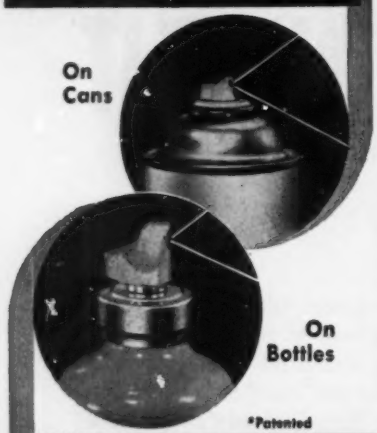
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Valve Division
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especially interested in acquisitions and joint ventures in companies that make electronic components, e.g., switches, relays; and companies with experience in high-temperature steels, glass or ceramics. A joint venture in metal halides is still another possibility. Recently, Fansteel employed an assistant to the president to develop acquisition or merger opportunities.

Marketing Manner: Sales emphasis is also changing. Next year, the firm hopes to stress sales of mill refractory metal shapes, subordinate work of fabricated process equipment. And, Fansteel sees its role in equipment fabrication changing too. In the future, the firm will emphasize engineering assistance to producers of equipment rather than attempt to develop a wider line of equipment itself.

Corporate image activity will figure prominently in future marketing effort. For many years, Fansteel has found itself linked, in the investor's eye, with the steel industry and Fansteel stock (listed on the New York Stock Exchange) generally follows steel stocks. The confusion stems in part from the company's current name — contracted and anglicized years ago from the original family name "Pfanstiehl."

To remedy this situation, Fansteel is now conducting "recognition studies" at trade shows and has engaged a prominent Chicago industrial designer. The ultimate goal, says Borendame, is to develop an image that looks "Modern, scientific, research-minded, progressive and reflects precision."

Looking Ahead: In recent months, Fansteel has taken steps to increase powder capacity in tungsten and molybdenum, has installed new sintering furnaces and sheet rolling equipment. This year Fansteel will spend $1 million in capital expenditures in its Chemical and Metallurgical Division alone. For '62, Collinsworth foresees doubling '60's capital investment. There's a chance the firm may spend $10 million within the next five years.

Because of the depressed price situation on transistors and semi-conductors, Fansteel will not show a significant profit improvement this year, says Collinsworth. Moreover, the many changes taking place will not fully manifest themselves in the short term. But he is convinced that '62 will bring higher profits.

Pollution Precaution

Air pollution-control devices will be installed on all new city-owned vehicles in Philadelphia. The devices return partly burned gases to the engine, eliminating up to 35% of the engine's hydrocarbon emissions.

City Managing Director Donald Wagner says that motor vehicles account for more than 40% of the estimated 1,350 tons of hydrocarbons emitted into the air over Philadelphia daily, 150 tons of which come from the city government's 5,000 vehicles.

The control equipment to be installed on the 400 passenger cars purchased within the next year will cost $3-5 each.

Legislation is being considered by Philadelphia officials to require all automobiles and trucks registered in the city to have similar control equipment.

And in another attack on air pollution, a new, $500,000 electrostatic precipitator is eliminating 95% of the dust formerly emitted from American Cyanamid's phosphate operations at Bradley, Fla. The twin precipitators, put in operation this month, collect dust previously carried out the stacks with the hot gases resulting from the plant process. This equipment is another step in the company's five-year program of pollution control at the plant.

Push for Stockholders

Chemical process companies are prominent in a new campaign urging the public to invest in private industry. Kaiser Aluminum & Chemical Corp. and Dow Chemical Co. typify a group of 63 American companies supporting the National Assn. of Investments Clubs (1245 First National Bldg., Detroit) movement to increase membership to 5 million by '65.

By organizing this movement, called the Economic Education Institute, NAIC hopes to increase member investment to more than $1 billion/-year. The club now includes 6,800 branches throughout the U.S. with 92,-000 members investing more than $2 million/month in securities.

Economic Education Institute will seek to acquaint potential investors with the fundamentals of private enterprise and sound investment practices. Groups expected to be included

in the educational program are teachers, housewives, civil servants, employees of industry and students in secondary schools and colleges throughout the country.

Among individual sponsors of the program are Carl A. Gertstacker of Dow Chemical, H. Glenn Bixby of Ex-Cell-O Corp. and R. J. Williams of American Metal Products Co.

Politics at the Plant

With a few exceptions, political campaigning will now be condoned at the gates of Du Pont plants. This policy results from an incident Oct. 13, when guards at Du Pont and General Aniline & Film Corp. plants in Linden, N.J., barred U.S. Sen. Harrison A. Williams from campaigning for Richard J. Hughes, Democratic candidate for governor of New Jersey.

Du Pont's policy: "Candidates of the major political parties and their supporters shall be extended appropriate opportunities when they appear at Du Pont installations, to greet or address employees at shift changes or other occasions, consistent with considerations of safety, efficient operations, traffic and the physical area."

LABOR

New Agreements: Inland Manufacturing Division of General Motors Corp. (Dayton, O.) and United Rubber Workers Local 87 have worked out a new, three-year contract covering about 4,000 production workers. The contract provides a wage increase of 7¢/hour each year, with 1¢ of the increase going into a pension fund each year. During the first year only, 4¢ of the increase will be applied to an insurance program; it will be fully paid by the company during the last two years of the pact.

• Finch, Pruyn & Co. (Glens Falls, N.Y.) paper mill management has reached an agreement with six unions representing 350 employees. Acceptance of a new, two-year contract settled a three-month strike at the mill.

• A. Schulman, Inc. (Akron, O.), and United Rubber Workers Local 76 have settled on a new hospital and surgical insurance plan providing up to 730 days of semiprivate-room hospital care for employees and retired workers and their dependents. Surgical and doctor allowances were also increased in the agreement, which runs to March 15, '64.

• United Fuel Gas Co. (Charleston, W. Va.) and its affiliates and four locals of Oil, Chemical & Atomic Workers Union have signed a new contract covering about 1,850 workers. The contract provides for an across-the-board increase of 9¢/hour effective last Oct. 1 and an 8¢/hour boost beginning Oct. 1, '62. Other provisions: three weeks' vacation after 10 years, shift differential increases, holiday changes and revisions in seniority and contract language.

• Libbey-Owens-Ford Glass Co. (Toledo, O.), and United Glass & Ceramic Workers of North America (AFL-CIO-CLC) have agreed on a two-year labor contract providing for an immediate general wage increase of 6¢/hour plus 4¢ for maintenance and production workers not covered by bonus plans. The contract also provides for a 6¢/hour general wage increase in the second year, beginning Oct. 25, '62, and a new early retirement plan.

• Workers at Gulf Oil Corp.'s plant at Port Arthur, Tex., have returned to work, ending a seven-day strike over job security. About 3,000 members of Oil, Chemical & Atomic Workers Union had refused to cross picket lines set up by Machinists Local 823, causing a plant shutdown and making 4,500 workers jobless. Gulf issued no comment.

KEY CHANGES

Raymon H. Mulford to president, Owens-Illinois Glass Co. (Toledo, O.).

Robert K. Mueller to the board of directors, **John R. Eck** to vice-president, Monsanto Chemical Co. (St. Louis).

Jack L. Forrester to controller, Scientific and Process Instruments Division, Beckman Instruments, Inc. (Fullerton, Calif.).

Otto N. Miller to president, Standard Oil Co. of California (San Francisco).

Sam Webb, Jr., to vice-president, **H. T. McBride** to treasurer, Atlantic Cement Co. (Albany, N.Y.).

Arthur C. Greber to vice-president, Richardson-Merrell, Inc. (New York).

C. H. Bell to chairman of the board of directors, **E. W. Rawlings** to presi-



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ADMINISTRATION

dent, General Mills (Minneapolis, Minn.).

J. Sinclair Armstrong to the board of directors, H. Kohnstamm & Co. (New York).

Robert A. Lubker to vice-president (research and development), Alan Wood Steel Co. (Conshohocken, Pa.).

Alfred Ewer to assistant treasurer, Bemis Bro. Bag Co. (Minneapolis, Minn.).

Donald H. Brewer and **Ralph M. Knight** to the board of directors, Rexall Drug and Chemical Co. (Los Angeles).

G. M. LeFave to vice-president and member of the board of directors, **Frank Y. Hayashi** to director of research and development, Coast Pro-Seal & Mfg. Co. (Los Angeles), adhesives and coatings manufacturer.

Charles A. Oclassen to president, **Willard A. Searle** and **Raymond R. Johnson** to vice-presidents, **Jerome Schimmel** to director of clinical research, **Karson J. Master** to assistant research director, Westwood Pharmaceuticals, division of Foster-Milburn Co. (Buffalo, N.Y.).

Stanley M. Freeman to the board of directors, Witco Chemical Co., Inc. (New York).

W. J. Woolley to vice-president and general manager, Plate Division, Henry Pratt Co. (Chicago), specialty steel fabrications manufacturer.

Arleigh Burke to the board of directors, Texaco, Inc. (New York).

John M. Harris to president, **R. Henry Wheless** to vice-president, The Best Fertilizers Co. (Lathrop, Calif.).

Allen S. Clarke to the board of directors, Weinschel Engineering Co. (Kensington, Md.).

Albert L. Nickerson to chairman of the board of directors, **Fred H. Moore** to the board of directors and executive vice-president, **Herbert Willetts** to president, Socony Mobil Oil Co., Inc. (New York).

Richard T. Arnold to president (Mead Johnson Research Center), **C. Joseph Genster** to president (Edward Dalton Co.), both divisions of Mead Johnson & Co. (Evansville, Ind.).

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CHEMICAL
NEWS
from
Allied Chemical
"Chemistry of the Stars" exhibit
Nation's most powerful missile
Fluorine rocket fuel oxidizers
Filament-wound rocket cases

How stars are born from vast clouds of gas and dust in space—how they develop heat and density as they contract —how they cool and die—is the subject of a new "Chemistry of the Stars" exhibit now on display at New York's Hayden Planetarium. One of the four units shows how this stellar evolution is accompanied by the evolution of many chemical elements and their distribution throughout the galaxy.

Directed by Museum astronomer, Thomas D. Nicholson, the elaborate three-dimensional presentation is a joint project of Planetarium astronomers and Allied Chemical scientists. It formed a key part of Allied's ;play at the recent American Rocket Society Exposition in New York and was presented to the Planetarium during the Show.

In the photo at right, Dr. Glenn A. Nesty, Allied Chemical Vice President for Research, discusses one of the four units in the study with Joseph M. Chamberlain, Chairman of the Astronomy Department of the American Museum of Natural History. In making the presentation, Dr. Nesty said that the study was given to the Planetarium for permanent display with a view toward "inspiring the younger generation to enter chemistry and the sciences."



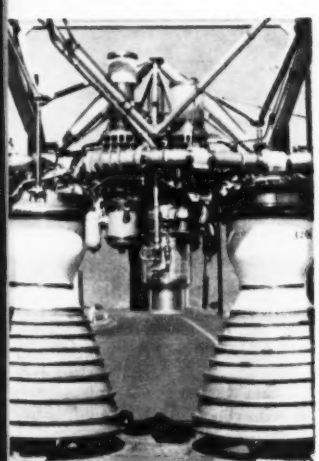
• *Allied Chemical scientists team with Planetarium astronomers to create stellar chemistry exhibit*

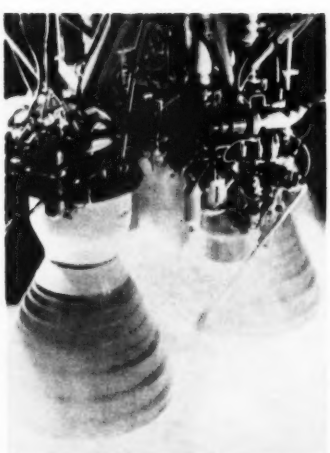
- *Nation's most powerful missile combines increased thrust, simplified design ... using liquid propellants and Allied Chemical nitrogen tetroxide oxidizer*

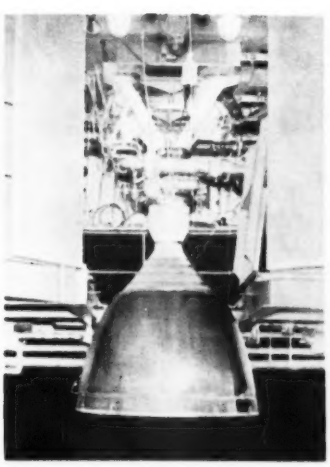
The use of storable, hypergolic propellants for Titan II, the nation's largest ICBM, has been a major factor in greatly simplifying its structure and control system while, at the same time, increasing its range and power.

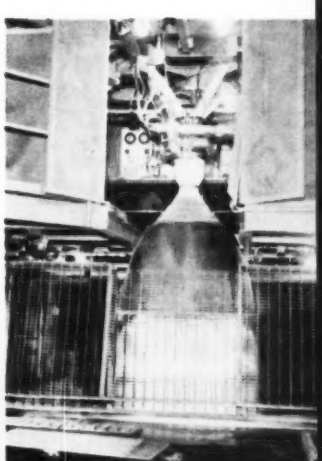
The fuel is a combination of unsymmetrical dimethylhydrazine and hydrazine—with nitrogen tetroxide, a product of Allied Chemical, as oxidizer. Unlike other oxidizers, the propellants for Titan II can be stored in missile fuel tanks at normal temperatures and kept in firing condition for long periods...and, as the propellants ignite on contact, no ignition system is necessary.

Nitrogen tetroxide is a low-cost oxidant which holds promise of serving well as an oxidizer in many industrial applications over a broad range of reaction rates—from the slow rates for metal recovery and fuel purification to the rapid rates required for explosives. Ask about its potentialities in your field.







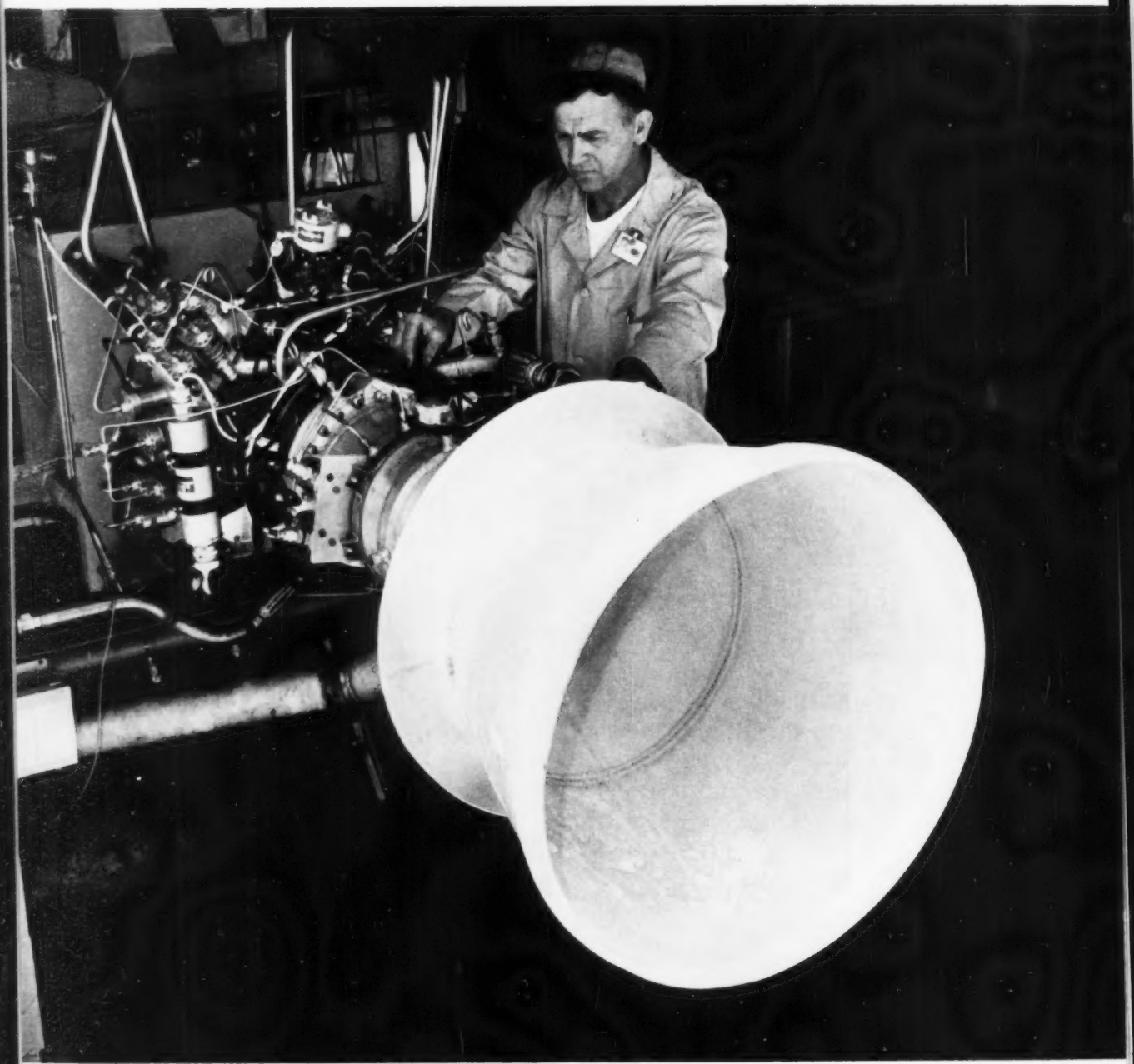


Photos Courtesy of Aerojet-General Corporation

NITROGEN DIVISION

• *Major space age role forecast*

for fluorine rocket fuel oxidizers



Fluorine Rocket Engine Designed and Built by Bell Aerosystems Company. This regeneratively-cooled, turbopump-fed fluorine engine has successfully completed a series of extended duration test firings which demonstrate the feasibility of a fluorine oxidized propulsion system for use in upper stages of space vehicles and satellites.

As America's space program intensifies, greater rocket range and reliability plus increased payload capacity are the order of the day. To obtain them, more and more research focuses on fluorine and its compounds for the exceptionally high specific impulse, hypergolic or spontaneous ignition characteristics, and high density they offer.

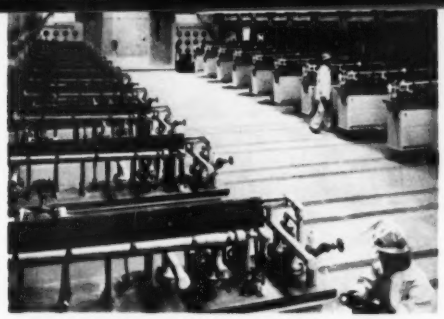
The potential applications for fluorine in rocketry extend over the entire propellant spectrum—from cryogenics to storable liquid to solid propellants. As America's primary producer of fluorine, Allied Chemical's General Chemical Division helps support the country's rocket and missile development program in three key areas.

For investigation of cryogenic systems in the super-high energy range, General supplies large quantities of liquid fluorine. For investigation of advanced, high-energy storable liquid propellant systems, General provides chlorine trifluoride (CTF) and other halogen fluorides. To serve both these areas, General has large existing production capacity, and can meet volume requirements.

In solid propellant systems, General is conducting intensive investigation under Government contract. Incorporation of the fluorine atom in the oxidizing molecule is part of this research.

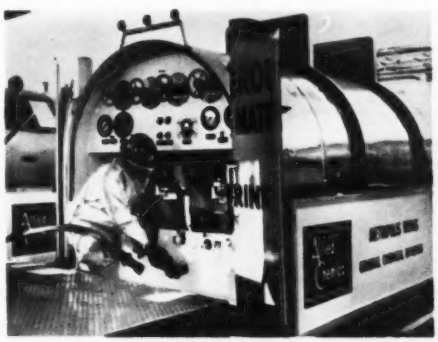
If you would like technical data, we will be glad to send you our free bulletins, "Fluorine" and "Chlorine Trifluoride." Simply request them on company letterhead.

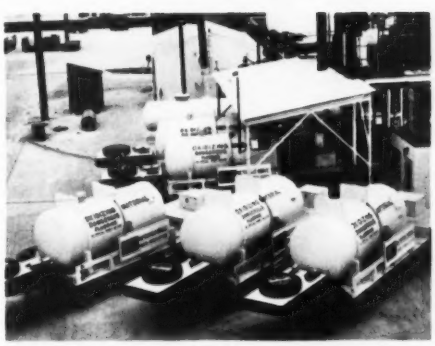
■ **GENERAL CHEMICAL DIVISION**



↑ Part of giant cell room at Allied Chemical's fluorine plant in Metropolis, Illinois. This is the largest privately owned fluorine production facility in the free world.

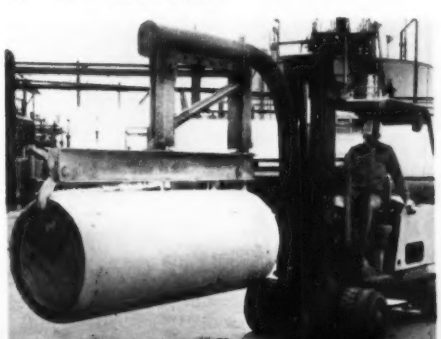
↓ Trailer tank trucks to ship fluorine as a liquid in bulk are an Allied Chemical research development. Resembling giant vacuum bottles in their construction, the tanks keep fluorine in liquid state in innermost chamber with a layer of liquid nitrogen in the second cell.

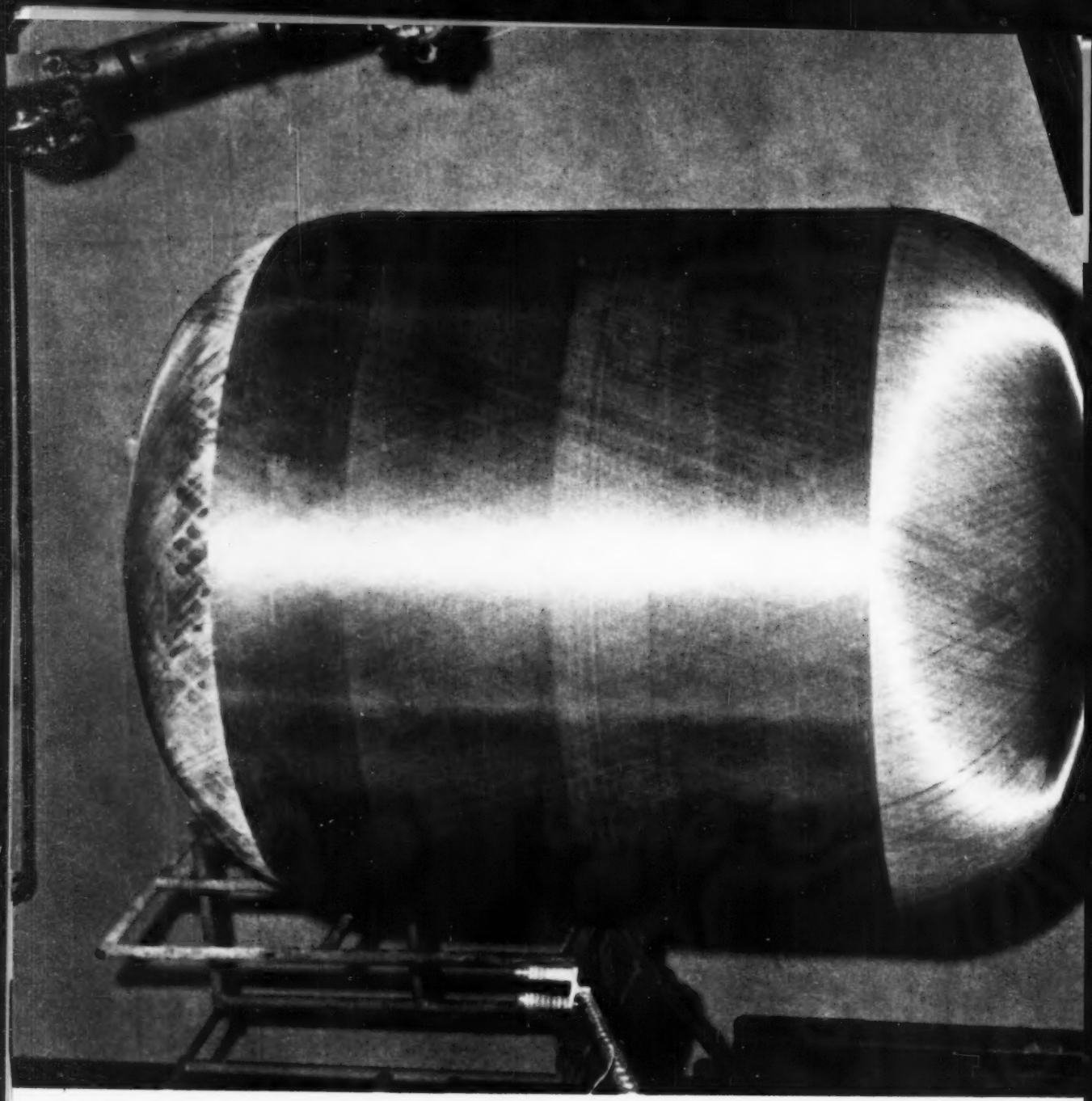


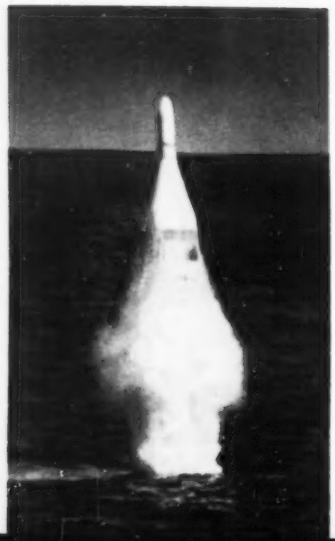


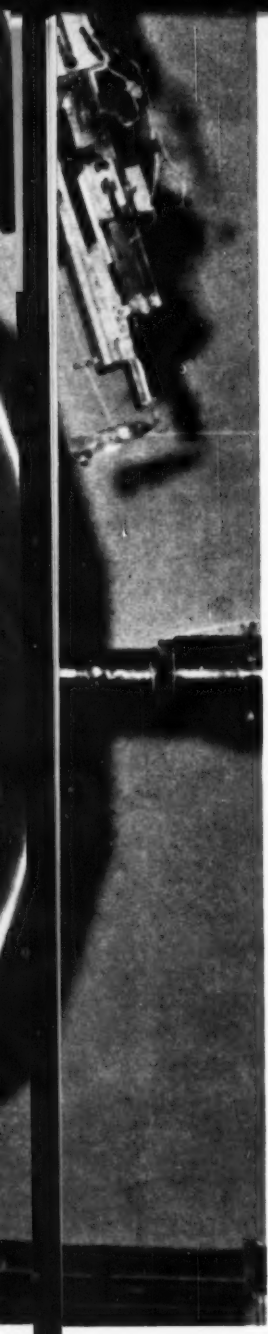
↑ 25,000 pounds of liquid fluorine are loaded in these five tank trailers ready for over-the-highway shipment to rocket and missile research centers across the country.

↓ Another product of Allied's fluorine research is chlorine trifluoride, best of the storable liquid oxidizers. Completely insensitive to shock, chlorine trifluoride is readily shipped and handled in ordinary one-ton cylinders such as this.









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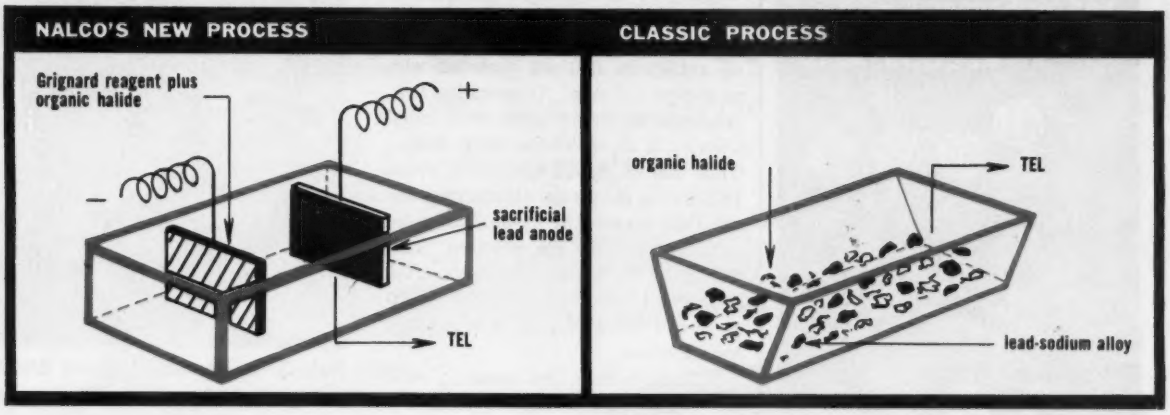
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Electrolysis Side-Steps Classic Lead-Sodium Reaction for Making TEL-TML



Sacrificing Anode Scores in TEL

The startup of Nalco Chemical Co.'s (Chicago) tetraethyl lead (TEL)-tetramethyl lead (TML) plant next summer at Freeport, Tex., will mark the first major change in processing of antiknock additives for gasoline in almost 40 years. The company is banking on its electrolytic technique to win markets in an increasingly competitive business.

Since '22, when Standard Oil Co. of New Jersey dropped out of the TEL business, Du Pont and Ethyl Corp. have dominated the field. Current antiknock additive sales are estimated at about $270 million/year. Until now, Du Pont has accounted for about one-third of the total, Ethyl Corp. two-thirds. Both use the classic process in which lead-sodium alloy reacts with ethyl chloride (to yield TEL) or methyl chloride (to make TML).

But last month the two producers were challenged by Houston Chemical, which placed its new TEL-TML plant (using the classic process) on-stream at Beaumont, Tex. (*CW Market Newsletter, Oct. 7*). Houston says it's seeking 15% of the market.

Nalco, in its bid to become the fourth producer, will run into some stiff competitive problems. For example, Du Pont and Ethyl Corp. have developed production know-how, while Houston Chemical has a head start thanks to an arrangement to supply Socony Mobil with some of its TEL-TML needs.

Although this year has seen two successive price cuts (1½% and 5% in July), the price of TEL-TML (based on lead content) has previously held steady at about 60¢/lb. Since this price depends on the production costs of the classic process, Nalco stands to win a healthy profit bonus if its basically different route can be made less expensive.

Complete details of Nalco's process are still confidential. The broad outlines of the process are spelled out in two Belgian patents (569,921 and 590,453) (*CW Technology Newsletter, Sept. 16*), assigned to Nalco in the name of David Braithwaite (*picture, p. 64*), the firm's president since April 24, '61. According to these patents, the process could win economic advantages over the classic route by:

- Allowing operation at moderate pressures and temperatures.
- Eliminating the formation of free lead, a highly toxic by-product of the classic process.
- Improving yields.
- Simplifying product recovery in a continuous system.

Sacrificial Electrode: The process is straightforward. A Grignard reagent, such as ethyl-magnesium-chloride, is electrolyzed in a solution of organic electrolyte. Under influence of the electric current, the Grignard reagent splits up. Its organic radical (ethyl) migrates to the anode. Magnesium migrates to the cathode. And the liberated halide (chloride) combines with a part of the magnesium that does not migrate.

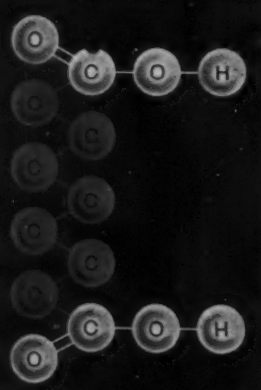
Meanwhile, the anode, made of lead, reacts with the organic radical so that the tetravalent lead atoms combine with four of the ethyl (or methyl) groups to make tetraethyl (or tetramethyl) lead. For this reason the system has been termed a "process of sacrificial anode."

In an improvement covered by the later patent (590,453), the basic process has been amended to include the addition of an organic halide, such as ethyl chloride, in the vicinity of the cathode. The organic halide reacts with free magnesium, as it reaches the cathode, and reconverts it to the Grignard reagent. Double advantage: (1) magnesium is not allowed to build up to the point at which it will interfere with the operation of the electrolytic cell, and (2) part of the Grignard feed is replenished within the cell.

This organic halide is added to the cell in varying ratios, depending on operating conditions and based on the magnesium produced. If too little is added, magnesium is left to collect in the cell. If more is added the organic halides tend to gasify and build up pressure above the cell.

Reviewing the Classic: In a similar manner, organic halides (ethyl chloride and methyl chloride) control the pressure of the classic process. In fact, the higher vapor pressure of methyl chloride — which requires sturdier equipment to contain it—is one reason

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The recent price decrease for azelaic acid widens its price advantage over sebacic acid and makes it an even more attractive raw material in its many areas of application. Azelaic acid is in wide use now in low temperature plasticizers, alkyd resins, polyesters and synthetic lubricants. And azelaic, produced from domestic raw materials, is in abundant supply with the start-up of Emery's second production facility.

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why TML was not produced until recently.

In the classic process, liquid organic halide is weighed in scale tanks and fed onto a mass of powdered alloy (90% lead, 10% sodium) in horizontal autoclaves that are provided with plow-type agitators. At operating temperatures the vapor pressure of ethyl chloride is about 90 lbs./sq.in. gauge, while that of methyl chloride is about 150 lbs./sq.in. gauge. Operating pressures are boosted by by-product gases generated during the reaction. This difference in pressure between ethyl and methyl chloride is sufficiently higher to call for a change in equipment specifications.

Nalco's system, by contrast, will blend the organic halides with the electrolyte, thus reducing their vapor pressures to the partial pressure of the solution. By using an electrolyte with a low vapor pressure, Nalco will probably be able to keep pressures nominal, even during TML production.

Electrolyte the Key: The choice of electrolyte is probably the key to Nalco's commercial operation. The patents suggest diethyl and dimethyl ethers of diethylene glycol, or other solvent-electrolytes containing aliphatic hydrocarbon groups attached to atoms of oxygen and nitrogen.

Other compounds, like dioxane, can be added to the electrolytes to aid in the separation of magnesium chloride from the cell. Pilot tests have shown that if the concentration of ethyl chloride becomes greater than that of the Grignard reagent, a resin is formed.

Ideally, the electrolyte satisfies four requirements: (1) allows the current to pass at high efficiency, (2) provides a high-boiling solution in which ethyl or methyl chloride will not cause pressure problems, (3) boils higher than TEL (390 F) or TML (250 F), so that these can be recovered by distillation and (4) precipitates the magnesium chloride.

With proper choice of electrolyte, the process can be carried on continuously, with the electrolysis bath maintained at constant concentration while the solution is withdrawn for product recovery.

Continuous operation offers a distinct advantage over the classic process. In the latter, the reaction deposits a by-product of lead and sodium chloride in a spongy mass that holds the TEL-TML. The autoclaves are vented and discharged into the kettles of batch stills partly filled with water; then steamed to boil off the TEL-TML, as the solids are agitated. The vapors generated in this still are extremely dangerous. Finely divided lead itself is a well known poison; and TEL or TML are poisonous on contact and inhalation—powerful solvents, which decompose to highly toxic fumes at 260-300 F.



Nalco's new president, David Braithwaite, sparked work on TEL process.

Methyl-Ethyl Mix-up: But Nalco's process appears to have one commercial disadvantage. In the examples cited in the patents, only pure TEL or pure TML is produced. On the other hand, Du Pont, Ethyl and Houston Chemical can make compounds that have both ethyl and methyl radicals attached to the same lead atom. These intermediate compounds may be able to combine some of the advantages credited to either TEL or TML, give the producers a wider product line.

The product flexibility offered by the conventional process results from the alloy-organic reaction. The lead-sodium alloy combines with the organic halide in a complex system in which organic radicals are first liberated, then combined with the lead. If the organic halide contains a mixture of ethyl and methyl chloride, equilibrium conditions can be adjusted to put varying amounts of both ethyl and methyl radicals on the same lead atom.

Through equilibrium control, Ethyl and Du Pont are producing five types of product: TEL, TML, triethyl-monoethyl lead, diethyl-dimethyl lead, and monoethyl-trimethyl lead. Hous-

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ton Chemical is believed to be producing the same range of compounds. All of these products are sold in blends with ethylene dichloride and ethylene dibromide, which act as scavenging agents to clean lead deposits from automobile cylinders.

Whether Nalco will be able to match this range of compounds remains to be seen. Although Nalco admits that its basic process is covered by the two Belgian patents, it points out that these patents cover a range of organometallic compounds and explains that the actual design details have not been disclosed. Also, it says that other patents are pending.

The existing patents allow for two possibilities for controlling the number of ethyl and methyl groups on the lead atom: (1) a mixed Grignard reagent or (2) a different organic halide. For example, if the Grignard reagent contained 85% methyl groups and the organic halide all ethyl groups, the resulting product would theoretically be trimethylmonoethyl lead.

In the meantime, Nalco is likely to get important aid from its Freeport neighbor, Dow Chemical. Dow will be supplying magnesium for Nalco's process and buying back the magnesium chloride by-product. Such an arrangement makes sense, since Dow is a large manufacturer of magnesium from magnesium chloride.

In addition to its tie-up with Dow Chemical, Nalco has another marketing advantage: it also produces catalysts, therefore is no stranger in the petroleum industry.

It's still too early to evaluate the effect of Nalco's entry into the antiknock additives business. The capacity of the company's new plant has not yet been disclosed; and it is difficult to estimate with certainty the investment or operating costs of its process. Nevertheless, the advantages shown in the basic patents indicate that the classic TEL-TML process may be in for some sharp competition.

Dew to Desalting

Dew-like condensation is the key to a new water desalting-purification process developed by General Electric and currently in operation at the firm's Los Angeles engineering laboratory.

The process operates at atmospheric pressure, but at a temperature

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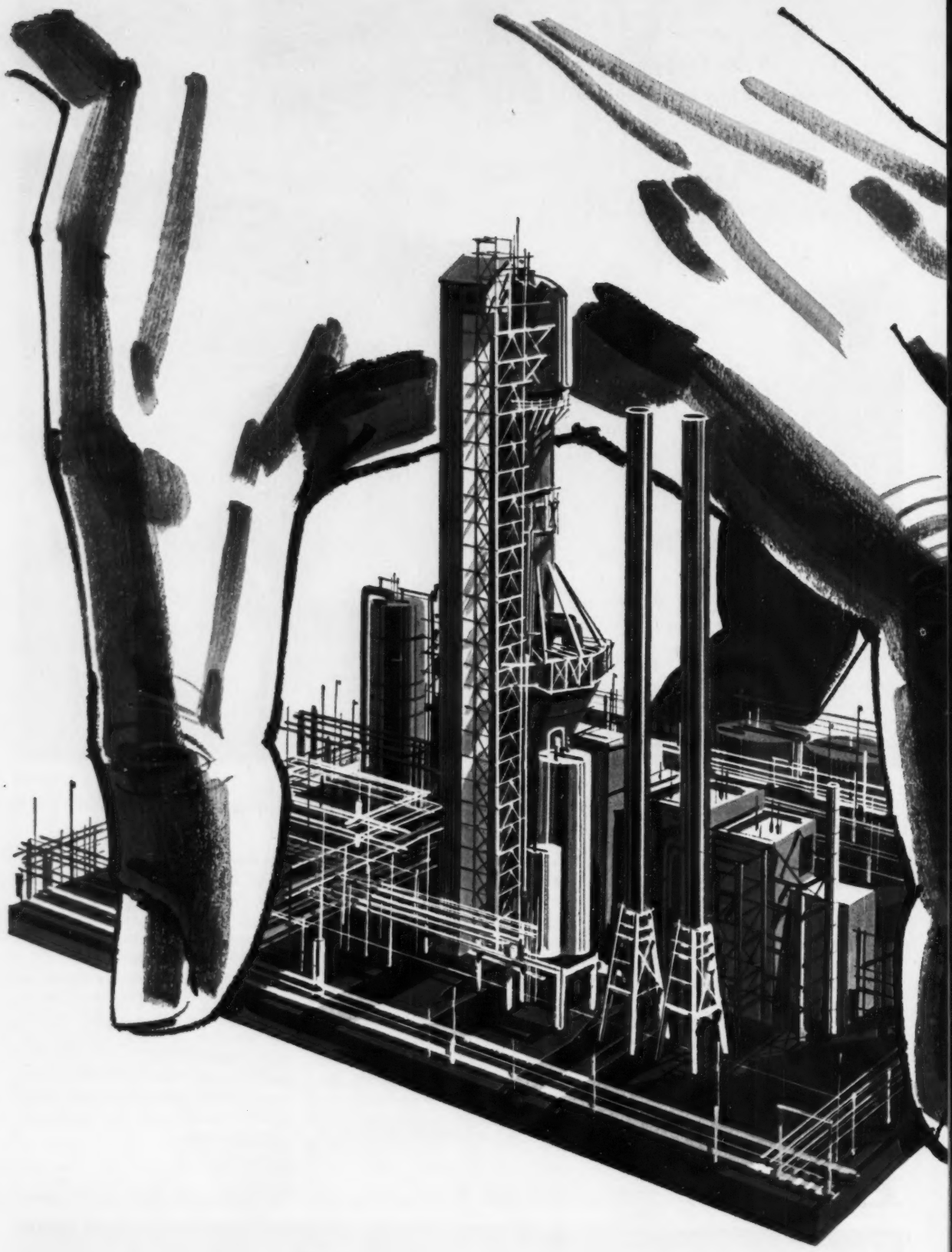
"It just didn't occur to me when I filled it out, but I can see why the item raised eyebrows in the Accounting Department," said one of our Materials Handling Supervisors. "So, prompted by their *more details* memo, I resubmitted the expense account in question with a notation as follows:

"For a one-day round-trip service call the amount indicated would appear excessive as far as personal articles are concerned. Actually my suitcase was full of steel fittings...intended for use in unloading a 10,000 gallon tank car of acetaldehyde. Subject tank car was shipped to customer for October 9 arrival. On October 10 customer telephoned that at start of unloading operation considerable leakage occurred in discharge connections. While all tank car unloading connections were carefully checked before shipment, we felt it advisable to provide on-the-spot assistance, especially since 15 psi. inert gas pressurized unloading of acetaldehyde was a new procedure for this particular customer. As it turned out the leakage was not caused by faulty fittings, but improper hook-up which was quickly remedied, allowing discharge to proceed routinely. It was then necessary to bring back the extra fittings, thus incurring a double-up excess baggage weight charge, which accounts for the unusually high expense item."

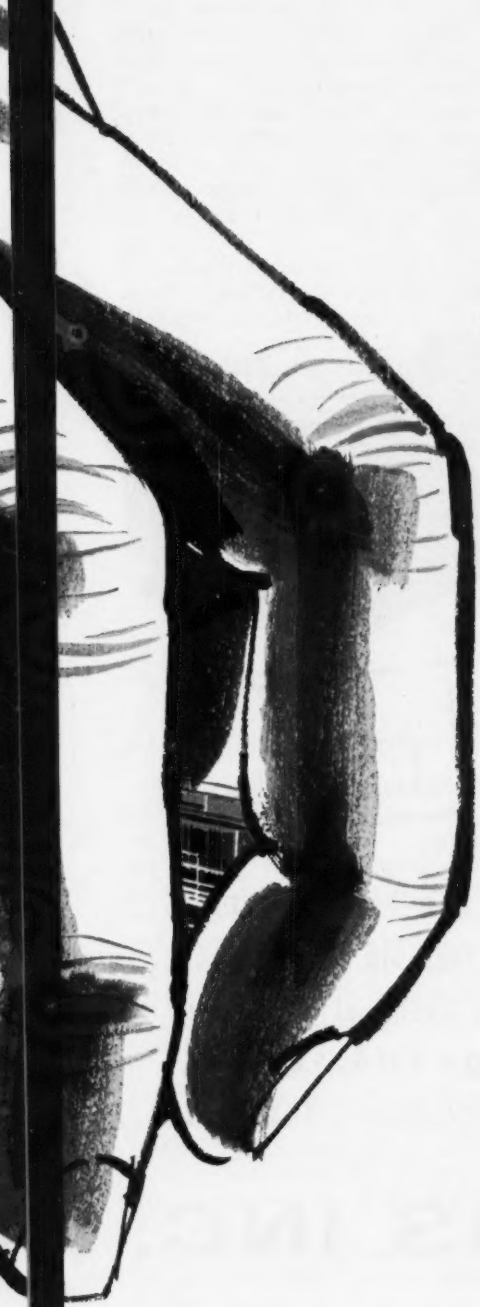
While this story indicates the eternal vigilance of our Accounting Department and their constant effort to control the cost of doing business, we think it serves to illustrate a more important point. That is, the cost of the trip itself was *not* questioned...because it came under the heading of *customer service.*

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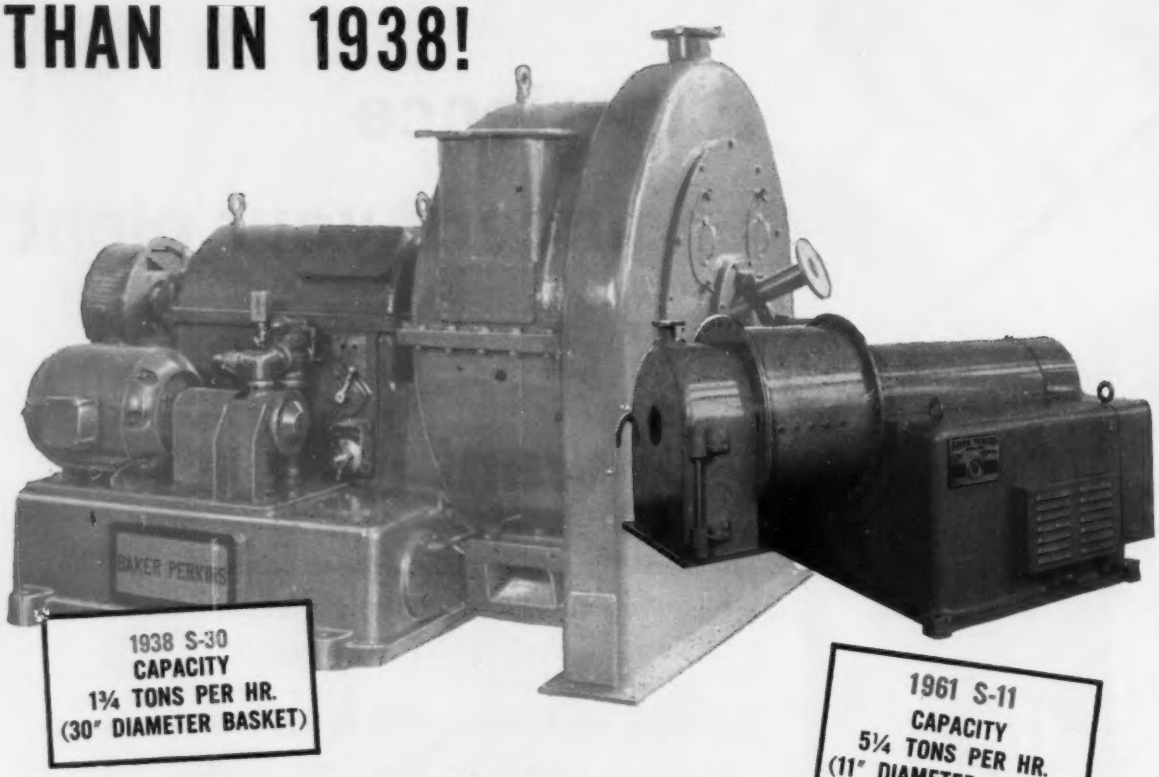
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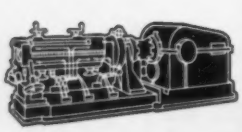
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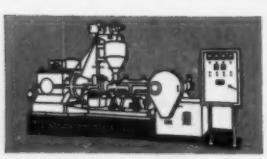
One unit does the work of three, which means that other expenses such as installation cost, power cost and floor space are drastically reduced.

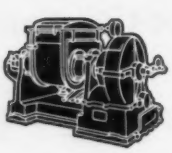
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lower than the atmospheric boiling point of water. It appears to be primarily adaptable to small mobile units with capacities up to 200 gal./-day.

The process depends on the combined effects of adhesion and dew-point condensation on a cold surface. It consists of a horizontal cylinder about 3 ft. long, 2 ft. in diameter. Inside the cylinder, a series of discs spaced a few inches apart rotate about a central drive-shaft at a speed of about one revolution per second.

As they turn, the discs pass through a bath of hot (210 F) water that fills the bottom half of the cylinder. Water adheres to the discs and is carried to the upper half of the cylinder, where the discs pass between cooled condenser plates. Due to humid evaporation, water vapor leaves the discs, condenses on the plates and the water runs down into a trough.

Incoming cold water passes inside the condenser plates, condenses vapors as it is heated to about 10 degrees below the temperature of the bath. Thus, heat consumption is very low and the power consumption to turn the drive-shaft is negligible.

Oil Waste Sweeper

Plant operators and municipalities plagued with oil wastes that collect and drift over the surfaces of lagoons and harbors may find help in a recovery process piloted by the Baltimore Port Authority.

The new method uses a roller principle similar to that of offset printing presses, recovers all the oil from the surface of the water but rejects water.

This is a switch from other processes, which clean the surface by sucking up water like a vacuum sweeper. These processes take up only 1-5% oil in water and must be followed by a separation step to put water back into the source.

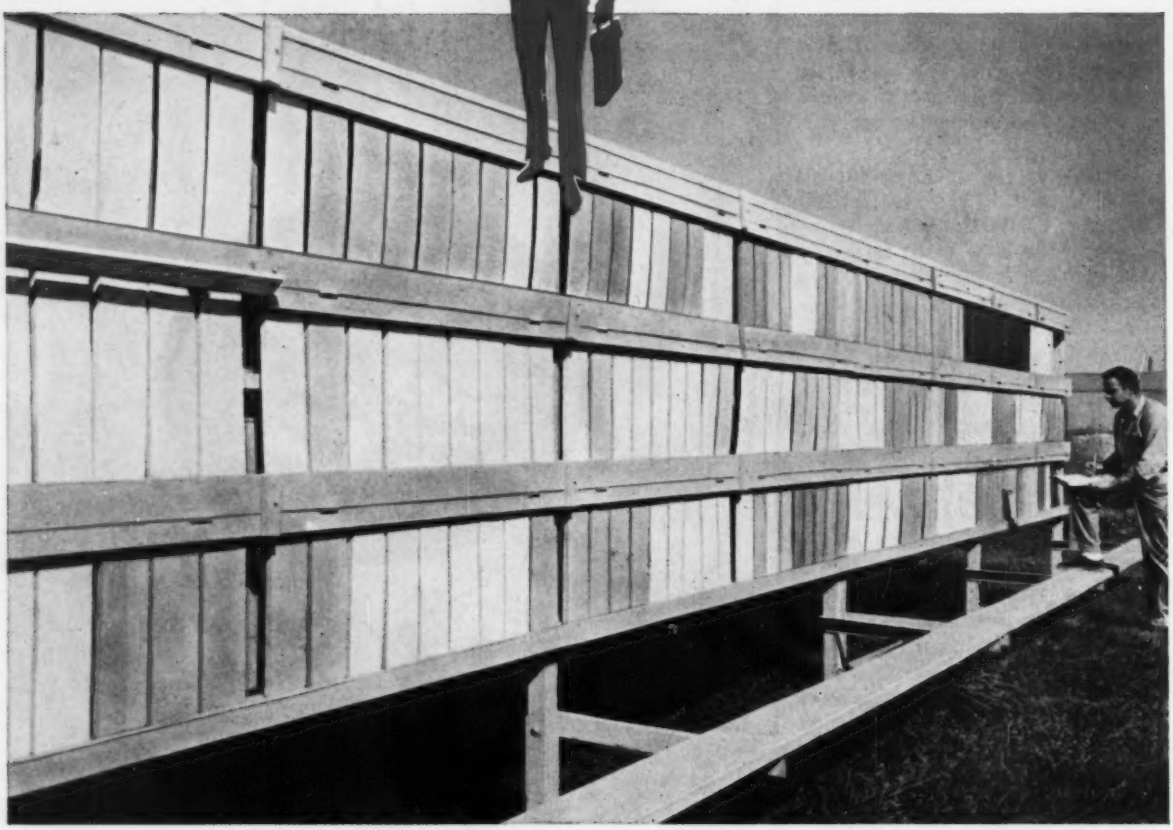
The new roller process takes up the oil (and some water) onto a rubber blanket. Because of differences in surface tension, about 80% of the liquid lifted from the surface is oil (20% water), which is continuously scraped off into a tank for separation by decanting.

Pilot tests in an enclosed area in Baltimore harbor proved the process,



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and the city of Baltimore is currently pushing design of a self-propelled craft for use in the harbor. The process is also adaptable to stationary units, such as refiners might use in a lagoon. It was developed by M. M. Earle, Baltimore naval architect, working with the Port Authority and the Baltimore Fire Dept.

PROCESSES

Continuous Zinc: A belt of aluminum strip that serves both as electrode and carrying material is the key to a continuous process for producing zinc that has been developed by the Soviets and reportedly is in commercial operation.

In the process, the aluminum belt passes through the electrolysis tank, while the zinc is deposited in thin layers. On leaving the electrolytic bath the zinc is stripped off. Advantages claimed: safer, less expensive operation.

•

Chicken Feed: Researchers at Montana State College are piloting a process to convert fertilizer-grade ammonia, dissolved in water, into protein, using barley as a cheap source of carbohydrate. Key: an enzyme of barley mould. The carbohydrade furnishes energy for fermentation. Yields are said to be good, and free of contamination. The dried yeast product has vitamin and protein value, can be used as a supplement in poultry food. Montana feed manufacturers currently import yeast protein in the form of soybean meal.

•

Ultrapure Hydrogen: Air Reduction Pacific Co. is starting construction of a new hydrogen plant at Richmond, Calif. The plant — cost, $1 million; capacity, 5 million cu.ft./month—will use a palladium diffusion system (*CW, Oct. 8, '60, p. 76*) to achieve ultra-high purities. This is believed to be the first commercial installation. Hydrogen source: reforming natural gas.

•

Nuclear Waterproofing: Gamma-ray bombardments are the key to a novel technique for impregnating cloth with a styrene polymer. The process was developed by Atomic Energy of Canada Ltd. A special machine is used to bombard nylon that has been saturated in a styrene solu-



Gas reforming hits a new high Engineering news was made in France recently, when a Chemico high-pressure gas reform furnace operating at 250 psi was placed on stream. Prior to the completion of this project, no gas reformer in the world had ever operated at pressures above 175 psi. Design innovations incorporated in this plant reduce compression requirements and increase heat recovery.

This historic breakthrough in gas reforming is indicative of the skill and experience which Chemico brings to all process engineering problems. Chemico services to clients in the process industries range from initial laboratory research and testing to final construction and start-up. If you are interested in learning more about Chemico, write to "Department B".

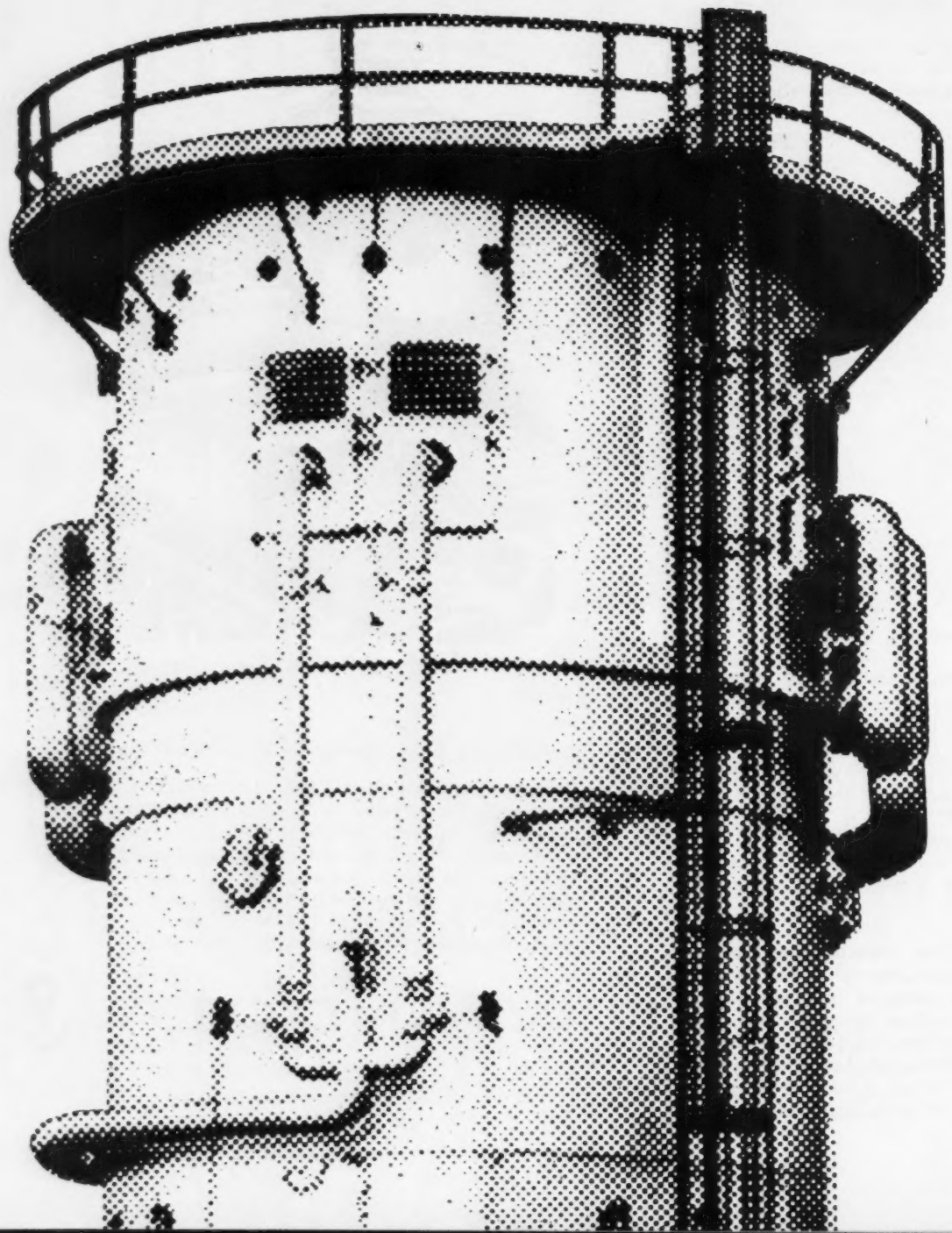
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tion. The resulting "grafted" fabric is reported to have far greater strength, durability and water resistance. The process is said to be easily adaptable to large-scale production, and AEC Ltd. plans to have its staff visit textile manufacturers to explain the technology. While past tests have been limited to nylon tenting material, it's believed that the process will also work with natural fibers such as wool and cotton.

•

Latest Desalter: Rocketdyne Division of North American Aviation, Inc., has a new pilot plant for desalting sea water. The unit is in its first phase of startup operation this week. The process follows the freezing route: (1) forms fresh water crystals, (2) washes the crystals, (3) remelts them to form fresh water. By using concepts of consultants Rosenstein and Gorin (San Francisco), the unit avoids all surface heat exchangers in the freezing cycle. Expected cost of the piloting operation: $1 million.

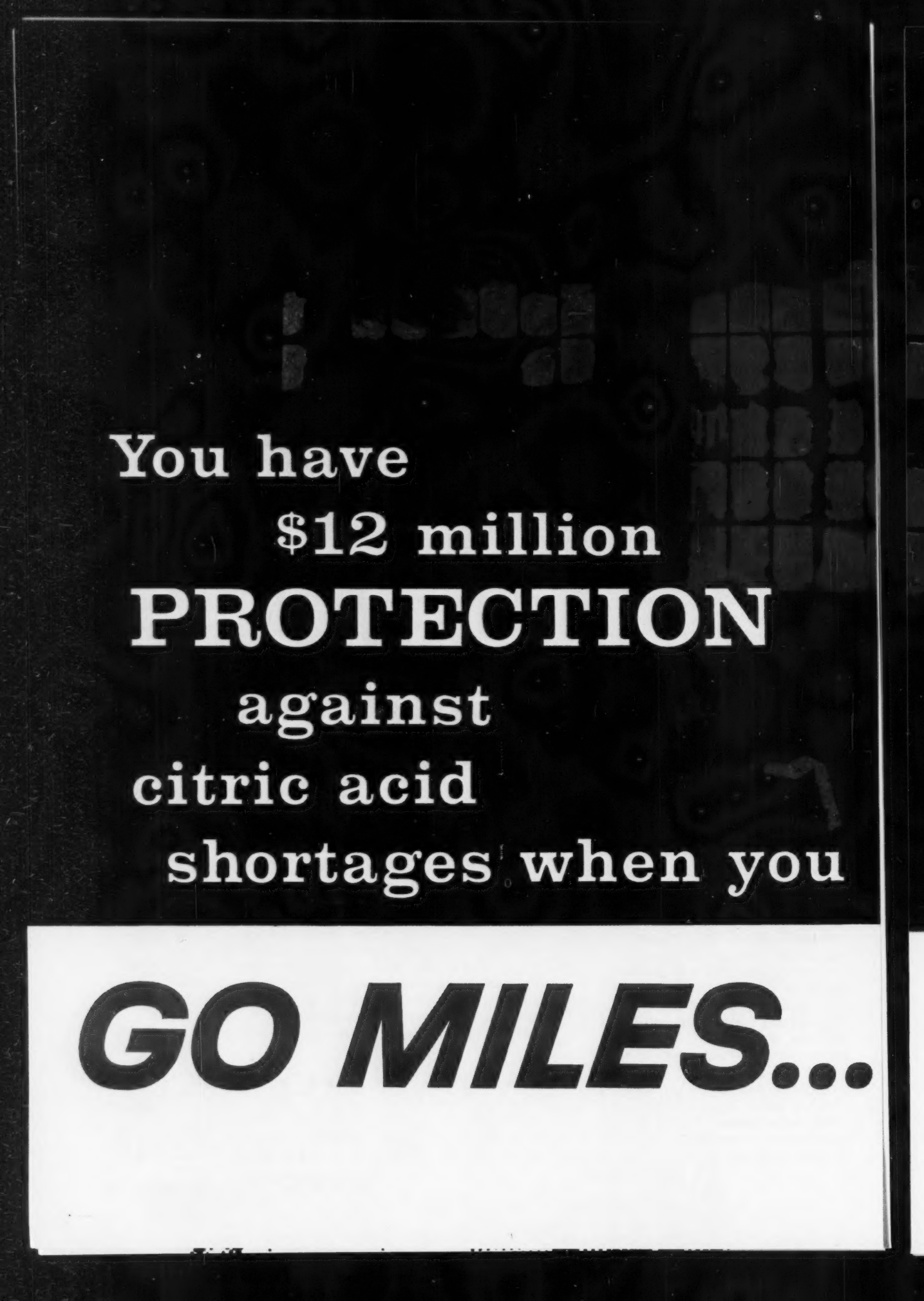
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Pulp with Methanol: The Czechs have developed a semichemical wood pulping process that uses methanol (one part to three parts of wood chips), along with sulfur dioxide (1.5%) and sodium formate (0.2-0.3%) to digest the wood chips. Cooking time is four to six hours at 275-295 F and 240 psi. gauge. The semichemical pulp yielded from the digesters is said to be easily defiberized in disc-type refiners. The methanol reportedly can be recovered, regenerated and recycled. And the lignin is said to be recovered in almost its natural form. The process was developed by the Pulp and Paper Research Institute of Prague, which is currently constructing a prototype plant to test the process.

•

Expanded Shale: A large rotary kiln and a rotary cooler are the heart of a $1.5-million plant that will produce lightweight glazed pebbles from shale rock via an expansion process. The unit, currently under design for Susquehanna Western, Inc., by Jacobs Engineering Co. (Pasadena), will be located near San Clemente, Calif. It is expected to start up early in '62, will have an initial capacity of 1,000 cu.yds./day of product. Cement block manufacturers are expected to be major users of the pebbles.




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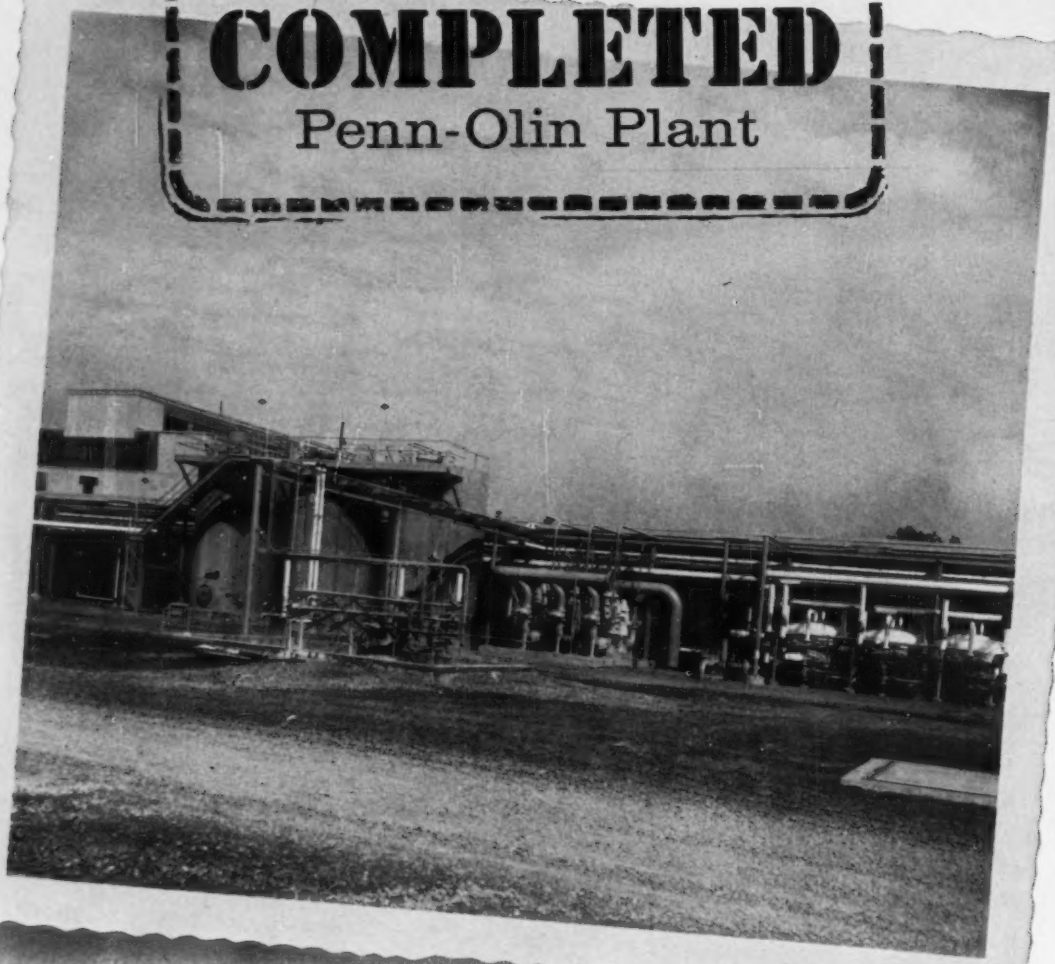
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CHEMICALS DIVISION **Olin**

Technology
Newsletter

CHEMICAL WEEK
November 11, 1961

A potential source of new antibiotics was reported last week by Merck Sharp & Dohme Research Laboratories at the Interscience Conference on Antimicrobial Agents and Chemotherapy in New York City (*see also p. 106*). They uncovered a crystalline form—antibiotic 19A—from a thermophilic streptomycete. These thermophiles grow at about 120 F, or 20 F higher than those used as a source for current antibiotics.

The new material, the first crystalline form ever isolated, has demonstrated high activity against a broad spectrum of disease-causing organisms. It also exhibits some toxicity toward animals. The hope is that the untapped thermophiles may become a source of potent new drugs.

•

Potent protection against pinworms is the promise of a new drug shown last week to the Southern Medical Assn. by Dr. Thomas S. Bumbalo of the University of Buffalo School of Medicine, a physician specializing in parasitic diseases of children. The drug, made by The Purdue Frederick Co. (New York), is called Pripsen (piperazine phosphate and standardized senna). Bumbalo reported the drug effective in 94.1% of cases of pinworms.

•

An unusual combination of Teflon fluorocarbon and molybdenum bisulfide has been developed by the Lockrey Co., Lubricants Division (Southampton, N.Y.). The new product, called Molyenamel E, capitalizes on the low coefficients of friction of both ingredients. It's said to retain the "release" characteristic of Teflon but to have better adhesion and resistance to corrosion than Teflon alone.

The bisulfide provides temperature and environmental stability, and imparts higher load-carrying ability to the Teflon lubricant. The product is aimed for effective lubrication in a broad temperature range—from cryogenic to 400 F.

•

Tonnage quantities of three nitrogen fluoride compounds—nitrogen trifluoride, difluorodiazine and tetrafluorohydrazine—are being offered by Air Products and Chemicals Inc. (Allentown, Pa.) During the past two years the firm has sold the bulk of its output to the military for evaluation in propellants programs. But APCI feels that there are numerous chemical uses for the products. It says the trifluoride compound shows promise for use in preparing fluorocompounds that cannot be derived from hydrogen fluoride; trifluoride is reportedly being used commercially in a self-fluxing flame for welding torches. And APCI terms difluorodiazine a potential building block for new types of synthetic compounds—e.g., inorganic rubbers.

One drawback to use of the compounds: high price. Difluorodiazine price ranges from $300/25 grams to $2,000/lb.; trifluoride,

$50/100 gm. of 97.5% + purity material (technical grade) and $75/100 gm. for 99.9% + purity (research grade); tetrafluorohydrazine, $50-70/15 gm. or $1500-, 995-/3 lbs. for the technical and research grades, respectively.

•

Prospects of food-irradiation look more promising as a result of a recent meeting in France of the European Nuclear Energy Agency's food-irradiation study group:

• The Canadian government has cleared irradiated potatoes for human consumption, and late in October started irradiating at the harvesting source, using a mobile unit equipped with cobalt-60. The Canadians did not give a cost breakdown but did say that the sprout-inhibiting technique is competitive with chemical treatment.

This sent French hopes soaring. Right now, potato irradiation in that country is at the pilot stage, due largely to the efforts of Pierre Vidal, the Lyons food-packer who heads Conservatome, a company set up by 39 firms in the food and agricultural industries. His group plans a bid for French approval late this year or early next and, in light of the Canadian precedent, has hopes of getting it.

• The Austrian delegation proposed an international project to pasteurize fruit juices. Bottle breakage in the pasteurization of apple juice by heating (in closed bottles) is as high as 30% in Austria. The Austrians would like to set up a semicommercial unit with cooperation from other countries.

• British researchers reported on their work to sterilize frozen whole eggs by irradiation. Conclusion: two years of feeding experiments and several years to obtain medical approval are required before the project can be commercialized.

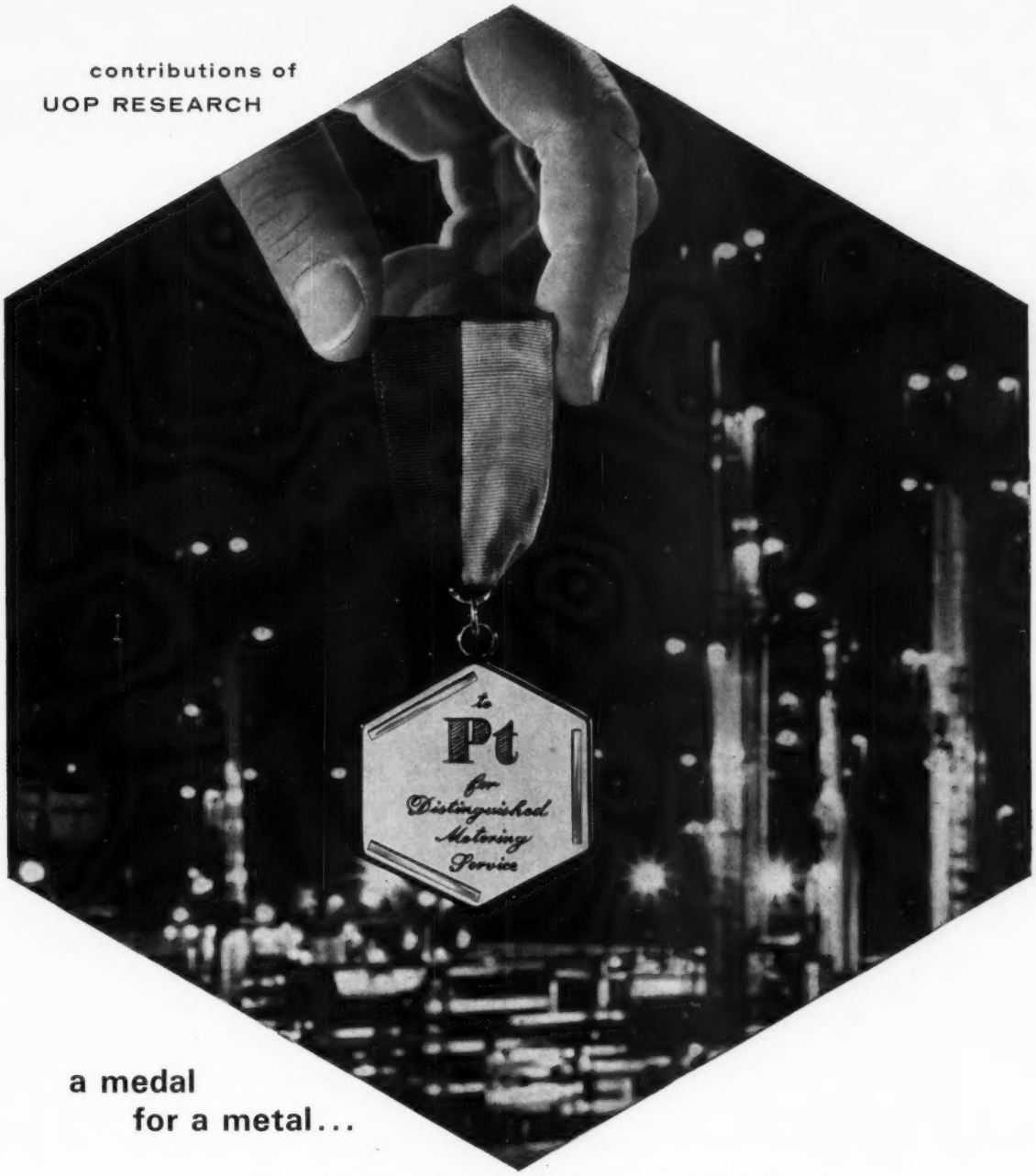
• The British also reported on a study of grain disinfestation through irradiation. They say that use of a cobalt-60 source is not economically feasible but that irradiation using an accelerator "looks competitive."

•

Direct firing of a coal slurry was successfully demonstrated by a group of companies (Babcock & Wilcox, Consolidation Coal, Texas Eastern Transmission, Jersey Central Power & Light) at JCP&L's E.H. Werner Station (South Amboy, N. J.). This is important to the future of coal pipelines. Normally, coal pumped through a pipeline must be dried before it's burned. Babcock & Wilcox developed a cyclone furnace arrangement that burns the slurry (70% coal, 30% water) as it is received from the line. The material used for the test was taken from Consolidation's pipeline (running from Cadiz, O., to Cleveland Electric Illuminating), then barged to the East Coast demonstration site.

Consolidation is considering several new coal pipelines—a 400-mile line from southwestern Pennsylvania to the East Coast, a 200-mile line from southern Ohio to the Detroit area, a 600-650-mile line from Utah to California. Two other coal pipelines reportedly are also under study.

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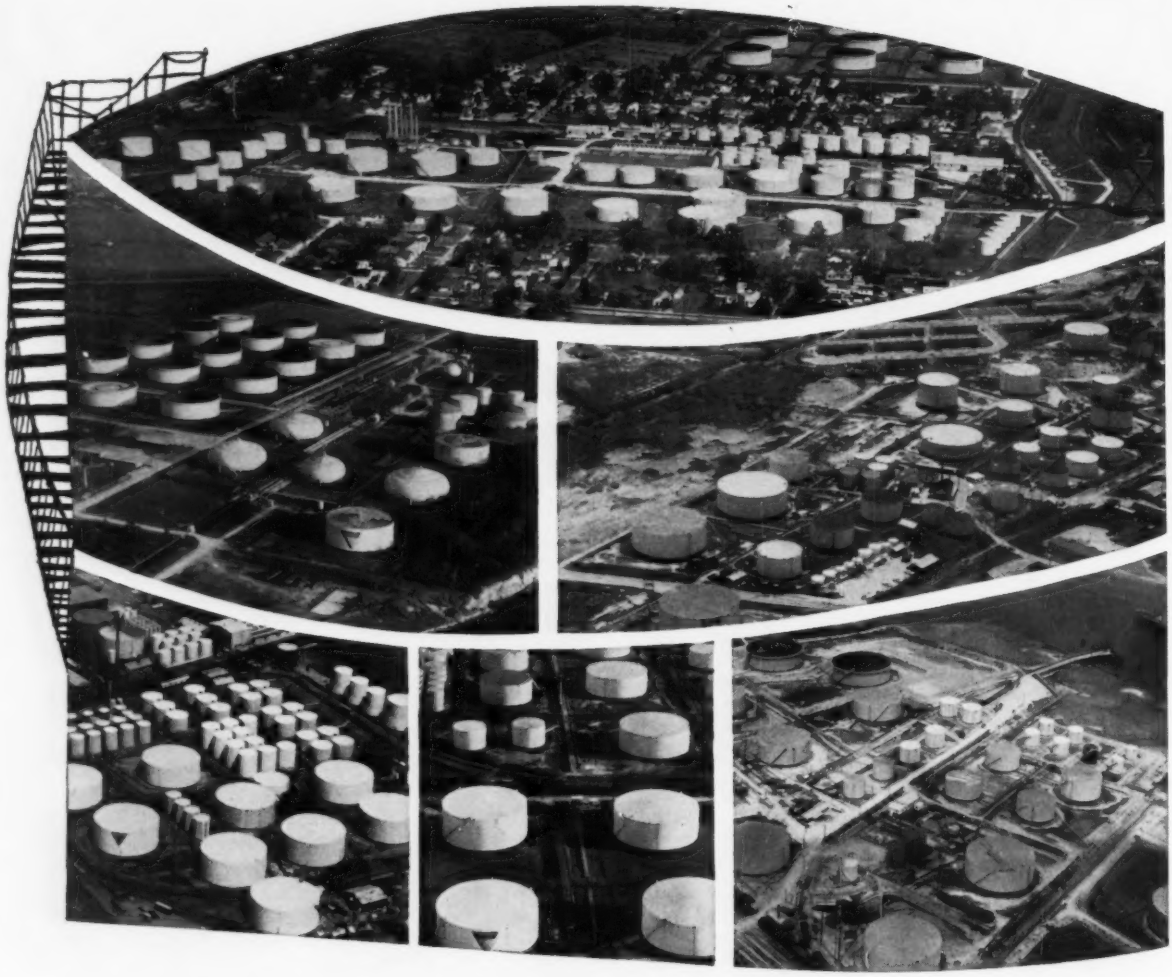
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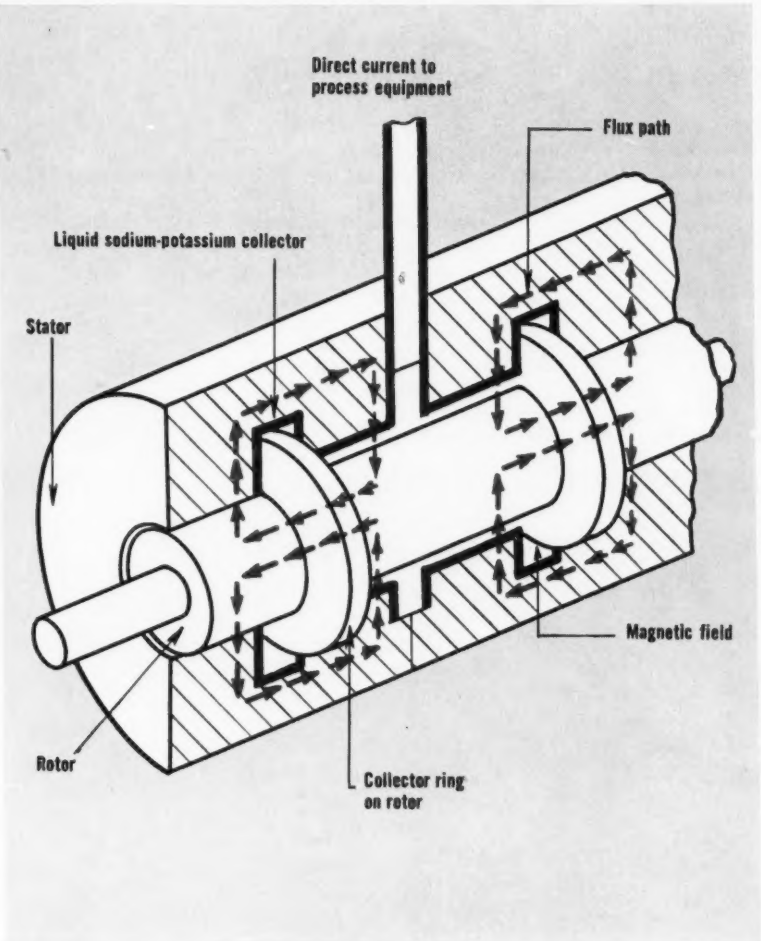
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New Direct-Current Generator–How It Works



Answer to Cheaper Power?

Users of large blocks of direct-current power—e.g., aluminum and chlorine producers—are studying the potential of new power sources that could have important bearing on plant location and operating economics. The newcomers—Allis-Chalmers' "unipolar" generator and General Electric's "acyclic" unit—produce direct current at substantial cost savings in areas where low-cost purchased power is not available.

Both companies have been moving cautiously in marketing their units. However, GE, which put its first units into operation without fanfare earlier this year at a wind-tunnel test site (*CW Technology Newsletter, Jan. 7*), is getting set to move into the market officially. Allis-Chalmers, which began experimenting with its generator in the early '50s and has had units in wind-tunnel and other test service since '58, is offering them for test facilities but is still not ready to supply them for continuous-type operations.

Behind their caution: the generators now in service have been working on a pulse or intermittent basis —large quantities of energy are released rapidly and periodically. As yet, no generator is known to have run on a continuous load for a long period of time—which would be required in a chemical process plant.

Allis-Chalmers says it now has a generator running in a continuous load test at its laboratories. The length of continuous testing that either Allis-Chalmers or GE would require before putting a generator into operation on an electrolytic cell line is open to conjecture, but a chemical company would probably want assurances of over a year of continuous plant operation.

True Direct Current: Barring unforeseen problems, the odds seem to favor success in continuous operation. The new generators are the only true direct-current machines that provide rippleless current and overcome commutator problems, says one engineer.

The principles of the Allis-Chalmers and GE generators are essentially the same (*see diagram, left*). Both use a sodium-potassium liquid metal system (developed as a result of atomic reactor research and called NaK—the chemical symbols) for collecting current. This liquid metal system overcomes the sparking and wear problems of slip rings and brushes—the mechanical contacts of the unipolar or acyclic generators built on a none-too-successful basis by several manufacturers in the '20s.

If Allis-Chalmers and GE succeed in proving long-term reliability of their units under continuous operation, chemical processors may have new economic freedom in selecting electrochemical plant sites.

Although the new equipment probably would not be competitive in areas where low-cost alternating current is purchased and converted into direct current by silicon rectifiers, it could conceivably lower the cost in areas where firms must now generate their own power.

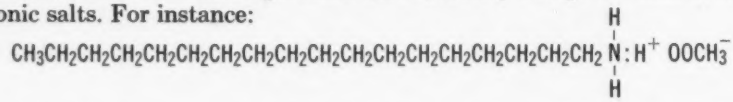
For example, GE studies show that the use of acyclic generators can save up to 20% in initial investment over the commonly used system of a steam turbine driving an ac. generator with rectifiers for an aluminum potline rated at 150,000 amps., 400 volts, 60,000 kilowatts. The steam turbine would be connected directly to several acyclic generators (probably six, each rated at 150,000 amps., 67 v.). The ac. generator and rectifiers would be eliminated.

In addition, there would be lower operating costs, says GE. Rectifier

New patterns in chemistry with General Mills FATTY NITROGENS

EXAMPLE: Fatty amines as corrosion fighters.

The fatty amines, such as Alamine 4 pictured below, readily accept H^+ ions to form positively charged cationic salts. For instance:

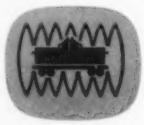


$$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2\overset{H}{\underset{H}{N}}:H^+\ OOCH_3^-$$

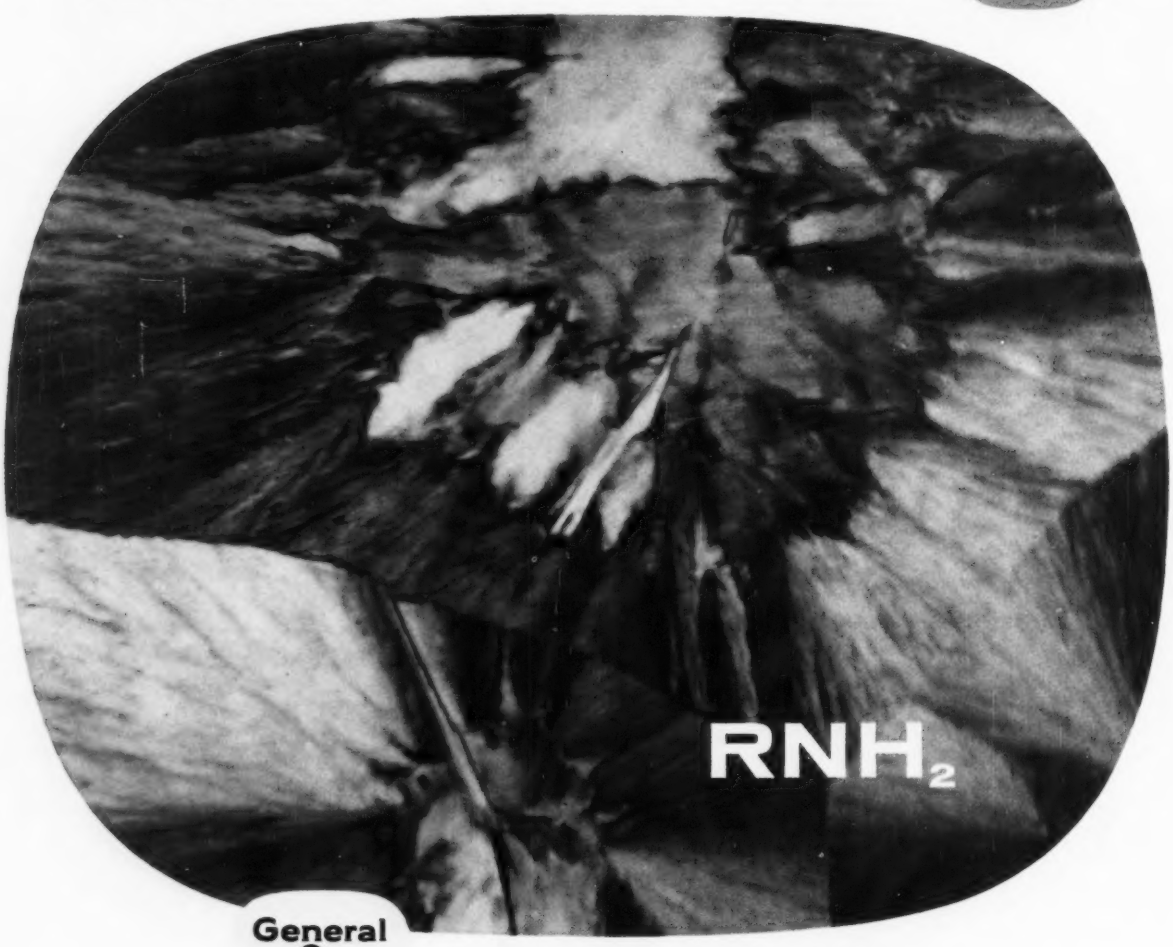
These amine salts film on metal forming a barrier against corrosive environments. The positively charged nitrogen group is strongly adsorbed on neutral or negative surfaces. The long chain unbranched alkyl group on the nitrogen repels water and permits close packing. Amine salts can be made either oil or water soluble.

General Mills produces primary, secondary, tertiary amines, fatty diamines and quaternary ammonium compounds that are useful intermediates. Their high reactivity permits specific chain length and degree of unsaturation in the derived product. The wide selection of fatty nitrogens permits varied solubilities, surface activity and biocidal properties.

Why not investigate the potentialities of General Mills fatty nitrogens in meeting your own requirements. For research samples and complete descriptive literature on these chemicals, write us at Kankakee, Illinois.



Crystals of lauryl amine, below, were photographed with polarized light at 100x magnification.



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losses, which normally might run 4-5%, are eliminated. And the acyclic generator's efficiency is 98.5% or better.

A chlorine plant would have high current requirements similar to those of an aluminum potline, but general energy requirements would be somewhat lower. For example, typical mercury cells might have current requirements in the 50,000-180,000-amps. range; diaphragm cells would typically have requirements of about 30,000 amps. Voltage requirements, of course, would depend on the number of cells in a cell line.

Based on the size of generator that GE mentions in its aluminum potline study (150,000 amps., 67 v., which is equivalent to about 10,000 kva.), a cell line with capacity of about 80 tons/day of chlorine would require one generator. Addition of cells to increase capacity would increase voltage requirements, require installation of a second generator in series with the first.

Allis-Chalmers' units have been smaller (e.g., 80,000 amps. and 75 v., 60,000 amps. and 30 v.), than those discussed by GE, but would fit into the range of today's requirements for chlorine plants.

Design Limits: The voltage produced by the new generators is set by the line current and speed of the turbine driver for which the unit is designed. For example, GE's acyclic generator for the aluminum potline application cited above, was designed for full potline load of 150,000 amps. and a speed of 3,600 rpm. Under these conditions, 67 v. is the economical limit for which the generator must be designed.

The new generators characteristically produce higher amperages, lower voltages and more kilowatts of power than do the ordinary direct-current generators. For example, a large dc. generator would probably not produce more than 8,000 amps. at 700 v. (5,600 kw.), while one of GE's acyclic generators would produce 150,000 amps. at 67 v. (about 10,000 kw.).

And because they can be driven directly by a turbine at high speed (e. g., 3,600 rpm.), they do not require expensive gear-reduction trains needed for conventional dc. generators. This might make chlorine plant location attractive in an area in which low-cost gas turbine fuel is available in addition to a brine source.

The use of the NaK liquid metal current collector has made high-speed operation possible. As the rotor is turned at high speed within a stator winding or field (i.e., energized coils that are concentric to the rotor), voltage is generated between the collector rings on the rotor. The collector rings ride in raceways that contain the liquid metal.

Electrical losses in the liquid metal are small, but still high enough to require cooling of the liquid metal by circulation through an external cooling system. The methods by which the liquid metal is circulated, the points to which it is circulated and the methods by which it is confined and sealed in seem to be the major differences between the generators produced by Allis-Chalmers and GE.

Both firms use nitrogen blankets to eliminate potentially hazardous air and moisture from the liquid metal system. GE has also operated the entire machine under nitrogen.

Whether chemical process industries decide to use the new generators, remains to be seen. But they are certain to get careful study. The low-cost power the units offer for some plants, and the new freedom they offer for plant site selection, are too great to be looked at lightly.

Plastic Parts Gain

Plastics have steadily gained favor as materials of construction for chemical process equipment over the past few years. Recently, chemical management was given a summary of the reasons why equipment salesmen have been able to convince plant equipment buyers of the advantages of plastics.

At a meeting of the New York Chemical Equipment Sales Engineers Assn. (at The Chemists' Club in New York City), Dorr-Oliver's Ted Meehan, manager of sales and services, pointed out that many obvious novelty qualities of plastics heighten interest on the part of the buyer and focus attention on the challenging design and use considerations. For example, the use of plastics in equipment cuts weight, often permits installation in older buildings without floor reinforcement and in new build-



New Dimensions of Fatty Nitrogens Revealed by General Mills

While making crystallographic studies of fatty nitrogens, a General Mills scientist discovered the unusual photograph you see at left. Here's the "inside" story:

A trinocular microscope quickly locates crystal area for examination. Large mirror (at top) speeds groundglass focusing, and an electronic light meter (lower left) determines precise exposures. Light source is conventional tungsten illuminator.

Crystals were grown in aqueous-alcohol media. Growth state of crystals, a single layer in thickness, was preserved with a topping of resinous mounting solution.

When exposed to polarized light, the fatty nitrogen crystals burst forth in a veritable aurora of color . . . the crystals refracting the light like a prism.

This picture, and others to appear in our advertisements, were taken at 100 x magnification. They grew out of the continuing basic research conducted at General Mills to find better ways to serve you of the chemical industry.

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ings with fewer, less costly structural supports.

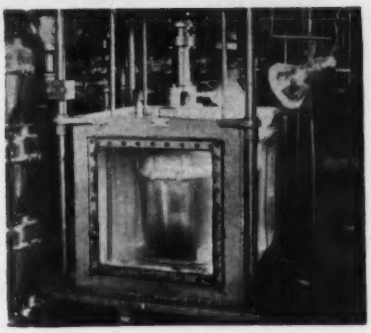
The cost of the equipment itself is one of the most important considerations, of course. Meehan cites the cost of an item, once made of wood for $50, that is about $140 in carbon steel, $260 in stainless steel—but only $100 in glass-fiber-reinforced plastic. In addition to offering corrosion resistance, the item in plastic can be made in colors to brighten plant decor. It can be easily cleaned and often can be repaired easily, inexpensively and quickly (e.g., many repair kits contain materials that require only a few hours of curing time).

Meehan adds that product quality is more easily controlled at modest cost—often in contrast to difficult, expensive control techniques required for some of the special-purpose metals with which the plastic competes. And, although plastics generally may not be equal or superior to other materials, in all physical properties, manufacturers are supplying plastics with a broader range of characteristics than ever before. Moreover, at moderate cost, a properly selected plastic may be equal or superior to any other material in many physical properties.

Forms Problems: The cost of forms (e.g., molds) for producing an item in plastic is a factor that buyers must reckon with, says Meehan. An equipment purchaser can't necessarily expect a lower price in a plastic item that is of special design requiring special production forms. However, additional items made from the same forms can greatly reduce manufacturing costs.

James Costigan, Sharples Corp.'s New York manager, added another important reason for the success of plastics in equipment. Critical examination of the new materials being offered has often focused new attention on many of the qualities of the process equipment itself. Also, the features of the plastic that may gain the interest of the potential buyer are helping to sell much of the in-other-ways-standard equipment.

However, an indication that plastic construction can't be used solely for its novelty appeal—it must perform at least as well as other materials of construction—is the case of an equipment maker who has searched several years in vain for a plastic for making gas meters (*see Target, p. 87*).



In environmental test chambers simulating rugged service conditions, plastic formulations have been tried, but found wanting as . . .

Pressure Mounts for Plastic Gas Meters

In the apparatus (*photo*) a prototype gas meter made of plastic is being subjected to a hot-water, hydrostatic test for leaks under pressure. It is one of 15 tests to which Rockwell Manufacturing Co. has put a myriad of plastic formulations for six years or more in a continuing quest for an acceptable plastic case for gas meters.

The search is considered a "top priority project among our research goals," says L. A. Dixon, Jr., vice-president of Rockwell's Meter & Valve Division, "even though aluminum has set performance records under a wide range of service conditions since '46."

The search points up the constant pressure for innovation and improvement in a competitive industry. And it provides the chemical process industries with a major challenge in plastic development and improvement.

According to Dixon, the overriding consideration that keeps the project in the top-priority category is that a plastic gas meter could have far greater life under universal service conditions than a meter made of other material.

For example, it would answer the problem of alkaline soils, which in many parts of the West corrode some metal meters within a year. Also, the plastic meter would resist, as does aluminum, the industrial and marine atmospheres that corrode tin and cast-iron meters.

In addition, plastics are relatively unaffected by fungal attack. And their nonconductivity is already being utilized in insulating swivels in current gas meter models.

Many plastics have high impact strength-to-weight ratios; light weight saves shipping costs, makes handling easier. Maintenance costs of a satisfactory plastic would be negligible. And, because plastics do not conduct sound as readily as metals, a quieter meter is possible.

In manufacture, metal meters require many machining operations. Plastics require few and lend themselves to more attractive designs in a wide range of colors. Rockwell's designers envision changes that would affect the mechanics as well as the appearance. A number of plastics—e.g., phenolic valves, nylon gears, guides and bushings and Delrin diaphragm brackets—are already in use.

Most Promising: Because of rough handling in the field, high impact strength is a meter-casing requirement that has pushed reinforced phenolics and polyesters to the fore. In tests so far glass-fiber-reinforced polyesters appear the more promising of the two.

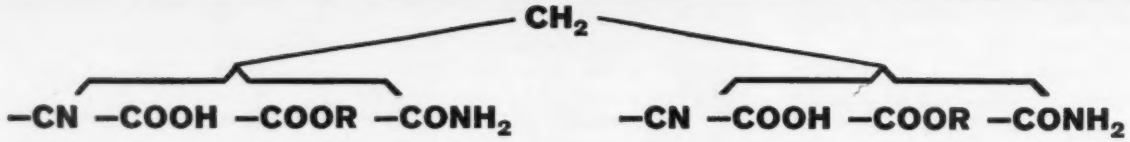
Among tests that the plastics must withstand: accelerated weathering in special equipment that bombards the candidate materials with ultraviolet rays, creates extremes in humidity and temperature (e.g., —60 to 150 F); accelerated corrosion tests in salt water; water immersion for 6-12 months for moisture absorption; flammability; soil tests in which meters are immersed in soil samples for 12-month periods; microorganism, insect and rodent exposure; impact trials at all service temperature conditions; torque tests on screw inserts to determine the point of failure in holding the cover to the body.

The formulations treated to date have passed many of the tests, but never all. Typical of the problems that remain is their weatherability. After 2,500 hours' exposure to weather, the surface resin of the phenolic and polyester formulations recedes, exposing the glass fibers near the surface. While weather tightness and water resistance may not be impaired, the "furry" surface is unattractive. A coating of epoxy or acrylic paint over the finished meter case overcomes the problem, but adds to cost.

Another problem: how to mold the case (it has many thin and thick sections) economically and in volume. The hand lay-up process is tedious. Here, the glass materials are sprayed onto a form, partly cured and then placed in a curing press, where the resin mix is poured over the formed glass. "Gunk" or premix methods (i.e., all materials are mixed together, then formed by the application of heat and pressure) must be used.

The rugged service requirements for gas meters present a strong challenge to plastics development. But the potential advantages in using plastics make it a challenge worth meeting.





There are ten possible compounds represented by the formula above, assuming that R is ethyl. Seven of them (plus two where R is methyl) are Kay-Fries products.* Replacing one hydrogen on the methylene group with another substituent gives 10 more. Replacing the other hydrogen gives another 10 and so it goes on and on. The possible variations are staggering in number. Their importance of course lies in what they will do — Products derived from this original group of active methylene compounds now supplement your diet, cure your ailments, put you to sleep or wake you up, make paint, clean metal, stick things together, and so on. What new applications may be developed from this highly versatile group only the future can tell. Certainly the opportunity should be inviting in your research program. We will supply samples and technical information to the best of our ability. Write us.

*Cyanoacetic acid, Cyanoacetamide, Ethyl cyanoacetate, Methyl Cyanoacetate, Malonic Acid, Diethyl Malonate, Dimethyl Malonate, Malonamide, Malononitrile.

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Translations of the papers given at International Aerosol Congress were available (note earphones).

Europe's Aerosolers Savor a Boom

Europe's aerosol business is booming. This year an estimated 220 million units—38% more than last year—will be produced in Western Europe, where the pushbutton products have taken firm hold. And, bolstering the boom, Communist-bloc Poland will soon set up Eastern Europe's first aerosol industry. That's the big picture as it was sketched at the Third International Aerosol Congress recently in Lucerne, Switzerland.

Francois Harlan, president of the Federation of European Aerosol Association (FEA), told 680 industry representatives from 22 countries about Europe's growing infatuation with aerosols. He cited these gains:

• An estimated 220 million nonfood aerosol units will be marketed in Europe this year—about 200 million in only four nations: England, West Germany, France, and Italy. Last year's European total was 160 million units, and the year before ('59), 98 million. (Comparable U.S. figures: an estimated 770 million units in '61; 670 million in '60, 575 million in '59.)

• Mainstays of the aerosol industry in Europe are insecticidal products, which now account for 40-50% of aerosol production in most countries. Next in volume: hair lacquers, deodorants, sun tan products.

Besides the top four, the only other items with much volume at present are pushbutton paints and perfumes. Generally these account for about 2-3% of over-all usage in most countries. Exceptions: England, where aerosol paints account for 5% of the total, and France, where pushbutton fragrances account for 15%.

• Top users of aerosol products in Europe are England and West Germany, each of which has a current annual consumption rate of about 60 million units (each has 27% of the European total). France consumes 45 million units (22% of the total) and Italy takes 30 million units (13%). Others: Holland, 6 million (3%); Sweden, 5 million (2%); Switzerland, 5 million (2%). The smaller nations take a total of 7-9 million.

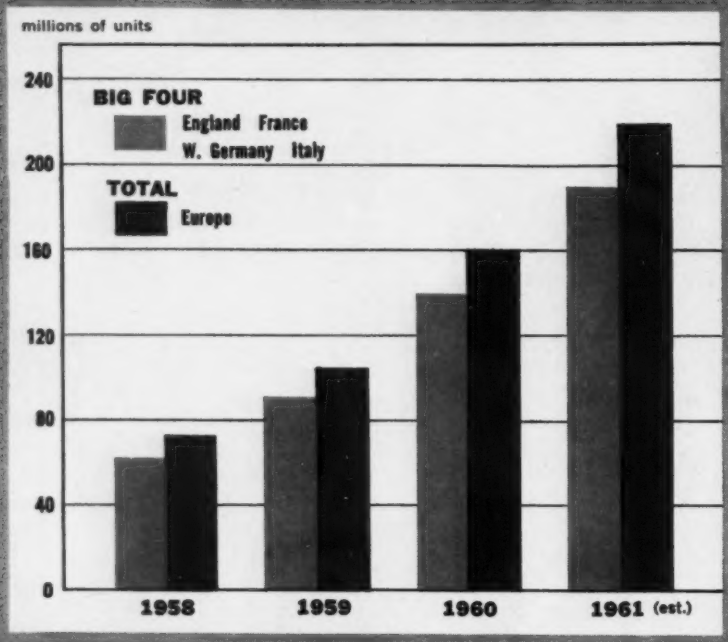
England's rate of growth in aerosols points up how rapidly the pressurized package can gain in popularity. That country had production of little more than 1 million units in '52. Output by '57 had grown to 10 million and by '59 to 23 million. Last year production reached 40-45 million units.

• Major new contributors to aerosol sales totals are relatively new items—e.g., aerosol starches, paints, varnishes and pharmaceuticals. But insecticides, hair products, etc., will continue gaining in volume.

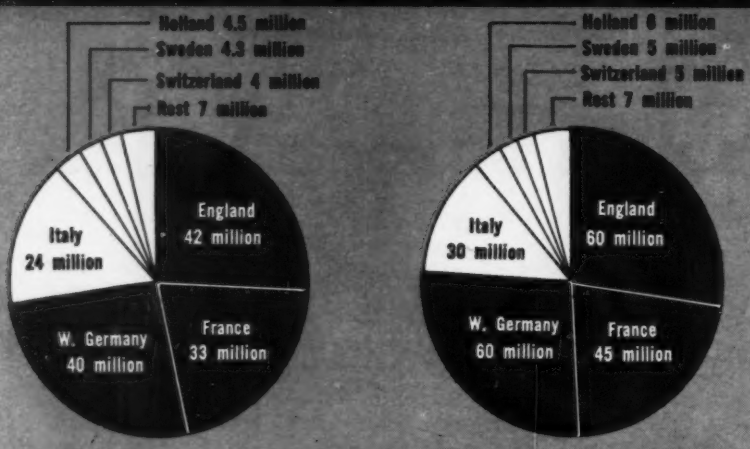
Cans Out Front: K. Jacobi, director of J. A. Schmalbach AG. (Braunschweig, Germany), continental Europe's leading aerosol container producer classifies European container usage this way: 65-70% of aerosols are packaged in steel cans; 25-28% in aluminum cans; 5-8% in plastic containers; 2-3% in glass containers.

While the main propellants used for

Aerosol sales in '61: estimated 220 million units



Top aerosol users: England, W. Germany, France and Italy



Insecticides, hair lacquers set product pace

	Product percentage breakdown							
	England	France	W. Germany	Italy	Holland	Sweden	Switzerland	Europe
Insecticides	45	40	45	50	70	21	40	40
Hair lacquers	15	20	20	20	10	26	25	15
Sun tans	8	10	12	6	10	10	15	10
Perfumes	1	15	2	3	1	1	1	2
Deodorants	20	10	10	10	7	12	15	15
Paints	5	2	3	1	1	1	2	5
Miscellaneous	6	3	8	10	1	29	2	13

aerosols in most European countries are fluorohydrocarbons (as in the U. S.), butane is widely used in France (for about 30-40% of aerosols produced). This has resulted in a significant reduction in sales price of aerosol products in France, also accounts for the widespread use of three-phase (liquid product, liquid propellant, gaseous propellant) systems instead of the more common two-phase (liquid propellant-product, gaseous propellant) systems. (U.S.-made window cleaning products employ the three-phase butane system).

In the future, however, there may be diminishing use of butane in European aerosols. Several national and international regulatory bodies are drawing up restrictions on transport of aerosol products containing flammable gases and also may limit their use—a familiar story to aerosol marketers in the U.S. Agencies in Switzerland and Germany are likely to be the first to enforce such regulation of production and use.

Some strides toward further standardization of European aerosol units are virtually certain. Currently, FEA is working on such problems as standardization of content, preparation of gauges, determination of clinch height and uniformity of operating instructions.

Some degree of standardization already exists; for instance, the 1-in. metal can opening is standard (as in the U.S.), and two types of glass bottles are used (those with 18.5-mm. and 20-mm. neck diameters).

Two Problems: Aerosols' growth in Europe appears to be inhibited by two factors. One is price—said to be a handicap in the U.S. as well. In the past six months there have been substantial price reductions in many countries. But there are limits to possible reductions—and they aren't always those of raw-material and manufacturing costs. In Switzerland, for example, retailer organizations rigidly control prices.

Another growth-inhibiting factor, and perhaps more significant than the price barrier, is the conservatism of the average European consumer; it takes longer for a new product to catch on in Europe than in the U.S.

But since both these problems are being tackled by skillful merchandisers, Europe's aerosol boom doubtless will continue.



R-A's Willihnganz: President of new company will be backstopped by . . .



Aerocide's Durant, kingpin in Canada's pressure packaging field.

New Faces in U.S. Aerosols

Later this month the first major aerosol-packaging plant in the Detroit area, Rochester Aerosol Corp., will begin operation about 10 miles from the U.S.-Canada line. Its location is significant: directing the venture is Canada's top aerosoler, Carl Durant —who has managed to acquire over 65% of the Canadian aerosol-filling business.

He has been brought into the U.S. aerosol picture by Robert Willihnganz, former partner of Alton Deutser in a Detroit consulting firm (Deutser & Willihnganz). Willihnganz, once vice-president of a custom chemical specialties compounder, ChemCrest Corp. (Detroit), has drawn a number of his former associates into Rochester Aerosol as well as several others from Durant's Canadian operation, Aerocide Dispensers Ltd. (Toronto)*.

The new company's plant is a one-time foundry, in Rochester, Mich., 28 miles north of Detroit. It will pack a range of products: insecticides and room deodorants to hair spray and laundry starch. Output of the 35,000-sq.ft. facility will be distributed mainly in the marketing area of 50-60 million people within 500 miles of Detroit. There are no major fillers in Michigan, but competition is expected from aerosol fillers in Chicago and Cleveland.

No Ties: Durant's Canadian firm, Aerocide Dispensers, is within competitive range, too — Toronto is less than 250 miles away. But tariff barriers between the U.S. and Canada will keep operations pretty well separated.

The two companies, moreover, have no corporate link, although Rochester is clearly counting on the impressive aerosol know-how of its Aerocide-trained directors. Durant's company now has an aerosol unit capacity (one shift) of 25 million/year (in a 30-35-million-unit market) and fills 65-70% of the pressure-packaged products in Canada.

Aerocide's main operations are at Rexdale, a suburb northwest of Toronto, where the company has two cold-fill lines (using fluorohydrocarbons) and a nitrogen/butane rotary line, mostly for food packaging. In Montreal, a fourth line is operated by its wholly owned subsidiary, John Struthers & Co., which Aerocide acquired last spring. That acquisition was a pleasant one for Aerocide since Struthers is within a block or two of Aerocide's prime accounts (S. C. Johnson and Colgate). The Montreal plant is holding its own in a battle for the business of these distributors with Aerocide's biggest competitor, Connecticut Chemicals (Canada) Ltd. (Toronto).

Uncrowded Summit: Durant has an almost unshakable lead, in volume, over competitors. Aside from Connecticut Chemicals, which books about 25% of the Canadian aerosol business, the only Canadian custom loaders of any consequence are Pentagon Chemical (Greenfield Park, Que.) and Aerosol Packaging of Canada (Scarborough, Ont.). A new company, Prodon Industries Ltd. (Toronto), offers some custom packaging besides its own Lady Patricia cosmetic line, but it has not been particularly active in aerosols.

Durant sees little danger of Aerocide losing its business to captive fillers. Few companies in Canada have the volume to justify such an operation.

R. H. Hollingshead Co. of Canada (Bowmansville, Ont.) has a semi-automatic line and Boyle-Midway (Toronto) has its own equipment. Both firms, however, also use outside fillers. Another important factor: Canada's sales tax, under which it is more advantageous to have the custom loader as "the manufacturer" who pays the tax, while the company that puts its brand on the label is known as "the distributor."

Durant (now 50 years old) got into aerosols as a result of a routine trip to the U.S. in '50. At that time he owned a small Canadian company that distributed sanitary chemicals, Cardel Enterprises, Ltd. On this trip Durant got his first look at a throw-away aerosol can—while visiting a packaging equipment manufacturer in Indiana. With $2,000 and some credit from the filling machine manufacturer and a can company (plus some financial backing from a few Toronto businessmen), Durant extended his Cardel Enterprises to include Aerocide Dispensers Ltd.

The tail soon began to wag the dog and aerosols pre-empted sanitary chemicals. In '50 the new operation (eight employees) had production of 242,000 units in a 5,000-sq.ft. plant. In '52 the staff was doubled and in '54 the company was moved to the 24,000-sq.ft. Rexdale facility that was expanded earlier this year.

Selling? Durant's board chairmanship at Rochester has raised anew questions about whether he is building an "empire" or seeking a way to slow down his active pace. He has so far zealously guarded ownership of

* Sales manager: J. Vaughan Blanchard, former director of aerosol sales for ChemCrest Corp.; Board members: Alton Deutser, president of ChemCrest; Kenneth Mitchell, executive vice-president of Aerocide Dispensers (supervised design of the plant); William Mitzelfeld of Radco. Secretary: Gordon Morrison.

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(C.H.Z.) — $2ZrO_2.CO_2.xH_2O$

APPEARANCE: (Both) — White, Moist Pulp

Both strongly adsorb oxygen-containing anions and oxygen-containing organic substances from aqueous solutions. Both remove many substances from solution by adsorption or sequestration and are used as ion exchangers.

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Cardel Enterprises, Ltd., the holding company through which he controls Aerocide and other interests. But his companies' rapid growth has created financing problems. A sympathetic bank has eased matters; also, a few years ago Durant negotiated a sizable loan from a supplier (in return for a long-term contract).

But associates say he's now thinking of cutting back. Several European investors were said to be interested in acquisition of the company. Durant says he has not been approached. He does admit that several U.S. companies have made offers. In the near future, he hints he may very well accept one of these offers. Such a move would not affect his position as chairman of the board of newly formed Rochester Aerosols.

The Rochester Deal: Rochester's financing should be no great problem. Helping to ease the financing task: Rochester, Mich., is classed as an "economically depressed area," and companies there are eligible for loans up to $250,000 at 4% interest from the Small Business Administration. Also, another $400,000 has been put up by a local development group, Radco (the Rochester Area Development Corp.). Moreover, Union Carbide (with whom Willihnganz was once connected—for research work on Prestone) is reported to have a financial stake in the new venture.

The 120-units/minute rotary line at the new plant will give the company an initial capacity of 10 million/year. However, the new packaging group points out that it can readily expand to 50 million units if necessary. With Durant as chairman, a man who built a $3-million business from $2,000 in 10 years, Rochester is getting a running start.

Safe Color Crop

A possible replacement for some of the banned red and yellow coal-tar dyes used in foods and cosmetics is being investigated by two University of Hawaii scientists, James C. Moomaw and Hiromu Matsumoto. Source of the dye is the lipstick pod plant, scientifically tabbed *Bixa orellana*.

The plant, which can yield 500 lbs. of dye/acre under Hawaii's growing conditions, is already used there to color pork, was used by Central and South American Indians in war paint.

PRODUCTS

Pigment Dyestuffs: Carbic-Hoechst Corp. (Mountainside, N.J.) is offering three pigment dyestuffs manufactured by West German parent Farbwerke Hoechst AG. Both are produced in a pure greenish yellow shade, are claimed to offer good tinctorial strength and to provide excellent fastness to solvents and heat. Industrial applications: Hansa Brilliant Yellow 10GX is suggested for graphic arts and paints Permanent Yellow FGL and Permanent Yellow H10G are designed for printing inks, paints, enamels and plastics.

•

Epoxy Cement: Plastic Associates (Laguna Beach, Calif.) is marketing epoxy cement in 1/10-oz. two-component mixer-packages for production lines, service kits and laboratories. Plastic PA-KIT avoids messy mixing of small quantities of epoxy cement by allowing both components to be stirred together in one package. Resin and catalyst come in contrasting colors to give visual indication of an even mixture.

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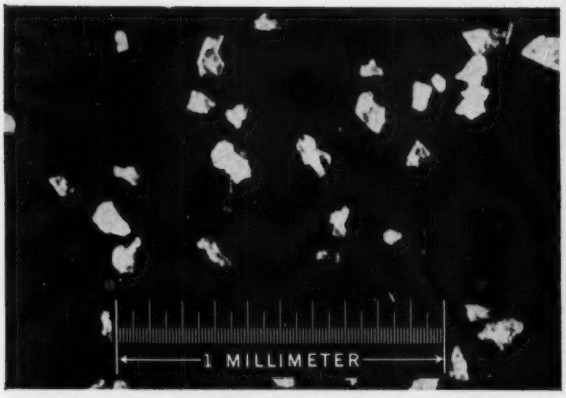
Polyethylene Emulsions: Franklin Research Co. (5134 Lancaster Ave., Philadelphia) is offering polyethylene emulsions tailored to fit industrial end-uses—e.g., as dye carriers, paper coatings and polishes. The emulsions—about 25% solids—are supplied in anionic, nonionic or cationic forms, and sell for under $2/gal. (in drum lots).

•

Fault Finder: Newest dye system for nondestructive detection of flaws in metal, Wes-Chek, is now offered in kit form by Westinghouse Electric Corp.'s Industrial X-Ray Division (2519 Wilkins Ave., Baltimore). The kit consists of a penetrating dye, dye remover, and dye developer—supplied either in aerosol form or in bulk quantity for dip inspection. Testing involves applying the red penetrant to the surface of the part, then removing excess surface penetrant with the dye remover (the penetrant having migrated into any cracks and flaws). Then the developer coating is sprayed as a fine powder, and any cracks or flaws show immediately as red indications on the white powder. These indications remain until wiped off with either wet or dry cloth.

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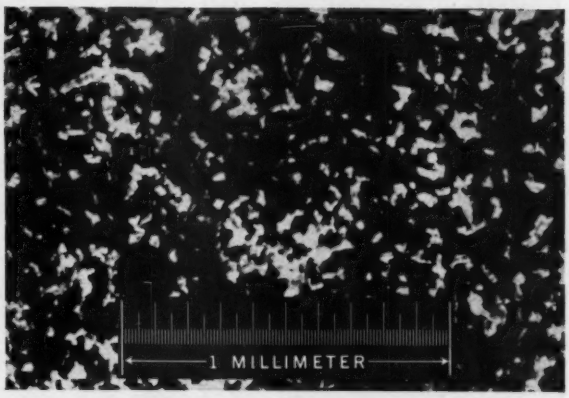
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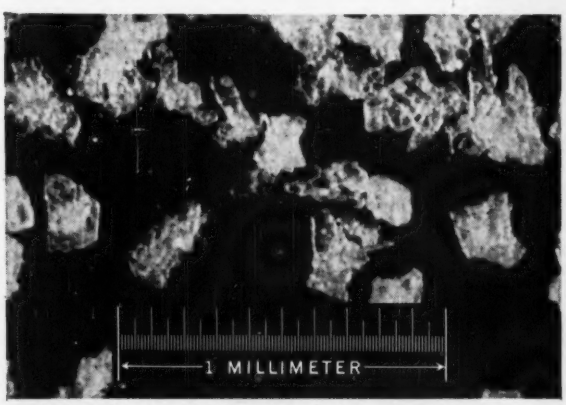
42 Mesh	Trace	200 Mesh	35.0%
100 Mesh	.5%	325 Mesh	70.0%
170 Mesh	20.0%	400 Mesh	80.0%



Sodium Bicarbonate U.S.P. Fine Powdered No. 3DF for use specifically in dry powder fire extinguisher mixes, also in rubber and plastics blowing, lubricant for sheet vinyl.

TYPICAL SCREEN ANALYSIS
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170 Mesh	Trace	325 Mesh	25.0%
200 Mesh	2.0%	400 Mesh	45.0%



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CUMULATIVE PERCENT RETAINED BY

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65 Mesh	27.0%	170 Mesh	99.0%
80 Mesh	66.5%		



Sodium Bicarbonate U.S.P. Treated Free-Flowing for use in fire extinguishers and sponge rubber.

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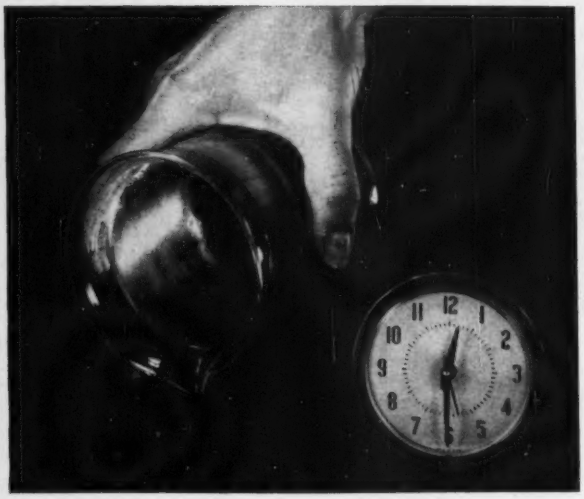
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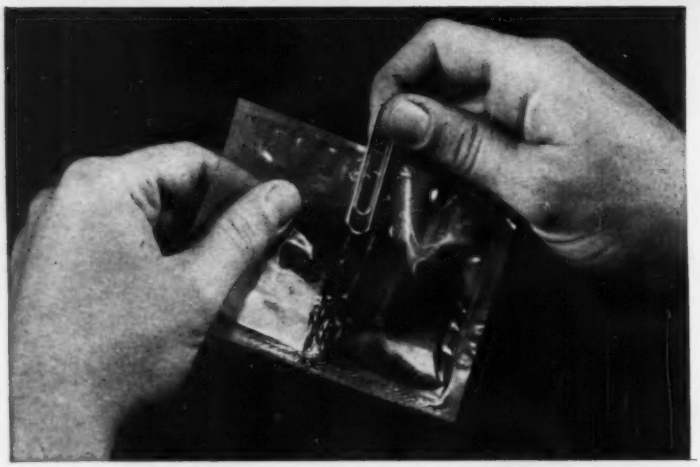
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G61-10

Market Newsletter

CHEMICAL WEEK
November 11, 1961

Total Canadian benzene capacity was more than doubled when Imperial Oil's new 30-million-gal. (U.S.)/year refinery went onstream at Sarnia, Ont., last week. The $5-million plant boosts Imperial's petrochemical plant investment at Sarnia to $45 million.

Output of the new plant will provide benzene for captive use, sale to Canadian buyers, and for export.

Increased availability of benzene from Canada may mean that U. S. consumers who have been buying benzene from European sources won't have to go quite so far afield.

Imperial Chemical is also obviously in a good position to supply toluene. Allied Chemical Canada, Ltd., has been tabbed as a likely customer because the firm plans to put up a diisocyanate plant in Canada (*CW Business Newsletter, Oct. 21*).

But Allied is still mum about its diisocyanate plant project, it will neither confirm nor deny conjecture that it will be in the 10-15-million-lbs./year capacity range and will be located in the Sarnia area (conveniently close to Imperial Oil's petrochemical complex).

•

Production of high-analysis diammonium phosphate fertilizer began, last week, at International Minerals & Chemical's expanded $3.2-million plant at Bonnie, Fla. The 120,000-tons/year unit will turn out a product containing 18% nitrogen and 46% phosphoric acid (P_2O_5).

Increasing demands for diammonium phosphate—especially in the Midwest—spurred the expansion. IMC's Bonnie plant also makes triple superphosphate, superphosphate, phosphoric acid, feed phosphates and sulfuric acid.

•

There's also new fertilizer capacity on the West Coast. A 60,000-tons/year plant owned by Dominguez Fertilizers—a company formed jointly by Shell Chemical, Stauffer and W. L. Dixon—has begun operations at Dominguez, Calif.

A variety of products utilizing various combinations of ammonia and phosphate will be made; some will also contain potash. Dixon is operating the plant under contract to Dominguez Fertilizers. All three parent companies (which have equal ownership) will market the products through their respective fertilizer outlets.

•

Price cuts on dynel modacrylic fiber posted last week by Union Carbide marks another step in the direction of general synthetic fiber pricing at a 70-80¢/lb. "commodity" level that experts have predicted will

evolve because of increasing competition between synthetic and natural fibers (*CW Report, April 15, p. 69*).

Significantly, Carbide revealed that promotion costs would be minimized to maintain lowest possible prices. The high cost of promotion has been strongly criticized as largely pointless at this stage of synthetic fiber marketing and a basic reason for inflated prices. Apparently the industry is now coming around to the view that synthetic fibers should be handled on a commodity status—at least in some areas.

Carbide's price slashes on dynel—ranging from 15¢ to 40¢/lb.—bring the fiber roughly into line with similar ranges for Orlon (Du Pont) and Acrilan (Chemstrand), which resulted from substantial price reductions a few weeks ago (*CW Market Newsletter, Sept. 30*). Carbide's new prices put most deniers of dynel into the commodity level—e.g., regular 3- and 6-denier materials are now 75¢/lb.; 12-denier, 70¢; 2-denier, 85¢. A 15-denier carpet staple stays at the 65¢/lb. pricing posted when the material became available earlier this year.

Similarly, Orlon prices now range from 79¢/lb. to $1.18/lb.; Acrilan, 74½¢/lb. to $1.18/lb.

Carbide's dynel price cut is partly due to earlier reductions made by Du Pont and Chemstrand. Big question now: Will Du Pont and Chemstrand cut prices of their materials again? So far there's no hint on that.

•

U.S.-made acrylonitrile is stirring up a ruckus in Japan. Japan's four leading chemical manufacturers (Sumitomo Chemical, Toyo Koatsu, Mitsubishi Chemical and Nitto Chemical) will appeal to the Ministry of International Trade and Industry (MITI) for imposition of emergency duties on future imports of acrylonitrile monomer from the U.S. Expected tariff increase: from the current 20% to about 40%.

But there's strong opposition from the Japan Chemical Fiber Assn., which is urging Japan's acrylonitrile makers to reduce domestic monomer prices to levels "satisfactory to fiber makers" if not to the level of U.S. monomer. The U.S. tag was recently cut to 14.5¢/lb.

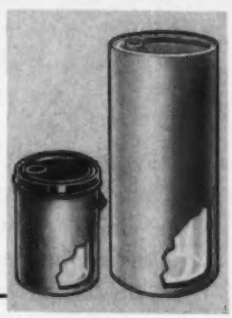
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First shipments of Chinese mercury to reach England in almost 40 years are the cause of declining British mercury prices, which—after the tenth reduction this year—dropped to the current $168/flask (the lowest market price in seven years). Soviet exports to England were blamed for falling prices earlier this year but are now discounted as a decisive factor.

The Red Chinese hope to sell 1,000 flasks of mercury to the British this year. In addition, Latin-American exports have been diverted from the U. S. to the U. K. in substantial amounts because of sluggish U. S. market conditions. List price of mercury in the U. S. is $188/flask (76 lbs./flask)—substantially higher than in England.



*Delaware's Disposable 15 Gallon Polyethylene Single Trip Container $2.97½ INCLUDING OVERPACK



- Non Returnable Container
- Available in 5 and 15 gal. sizes
- Molded-Seamless
- Variety Of Closures
- Steel Or Fibre Drum Overpaks
- Light Weight–Low Cube
- Low Freight Rate

Here's your big savings break-through on packaging and shipping costs . . . Delaware's Featherweight NON-RETURNABLE (disposable) POLYETHYLENE DRUMS. Your immediate advantages include lower initial costs, lower tare weights, lower handling costs and lower shipping costs for your products. Write today for complete descriptive literature.

FILL IN AND MAIL TODAY FOR IMMEDIATE FREE SAMPLE!

DELAWARE BARREL AND DRUM COMPANY, INC.
WILMINGTON 99, DELAWARE

Gentlemen: Kindly forward to my attention, on memo billing, a sample of your Featherweight Poly Single Trip Container and complete descriptive literature and pricing.

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Delaware goes with your product

BARREL AND DRUM COMPANY

WILMINGTON 99, DELAWARE

Sales Offices: Wilmington, New York, Chicago, Philadelphia, Cleveland, Houston, Los Angeles

TYPICAL PROPERTIES OF SHELL TOLU-SOL THINNERS										
Tolu-Sol	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Distillation °F. (ASTM D-86)										
IBP	199	199	199	199	200	203	204	204	205	205
Dry Point	215	217	220	222	223	227	228	230	230	231
Specific Gravity 60°/60°F.	0.699	0.714	0.721	0.729	0.734	0.747	0.751	0.761	0.769	0.785
Composition, %v										
Paraffins	88	82	77	73	69	64	60	56	51	46
Naphthenes	9	8	8	7	7	6	6	5	5	4
Aromatics	3	10	15	20	24	30	34	39	44	50
Absolute Viscosity centipoise @ 77°F.	0.41	0.41	0.41	0.42	0.42	0.43	0.44	0.44	0.45	0.46
Aniline Cloud Point °F.	148	134	123	114	107	93	86	75	64	55
Nitrocellulose Dilution Power* (ASTM D-1134)	1.22	1.32	1.40	1.49	1.53	1.62	1.68	1.76	1.84	1.92

*Also known as Lacquer Dilution Ratio

Comparison chart shows how range of solvency of Tolu-Sol family widens the choice of diluents for your formulations. *If an intermediate grade is needed, ask Shell to make it for you.* For help in choosing the grade that gives the optimum combination of properties and cost for your formulations, call in your Shell Industrial Products Representative.

BULLETIN:

Shell announces a large new family of Tolu-Sol thinners that allow you to choose the precise solvency you need

From today, the name Tolu-Sol® applies not to one product, but to a complete family of hydrocarbon solvents.

Shell's new Tolu-Sol family is characterized by extremely low naphthene content and closely controlled aromatic content. The family has a wide range of solvent power—but similar volatility. Here are the facts.

Now you can select precisely the right solvency for your needs from a family of thinners with similar volatility but different solvent power. *Shell makes this flexibility possible with its new Tolu-Sol family.*

The composition of these thinners is characterized by a low naphthene content and a closely controlled aromatic portion. Within the family, the aromatic content varies from less than 5 per cent to about 50 per cent.

How to identify each grade

The percentage of aromatics identifies the grade of Tolu-Sol. Thus, Tolu-Sol 10 contains approximately 10 per cent aromatics. Tolu-Sol 50 has approximately 50 per cent aromatics.

The Tolu-Sol you have known for years is now called Tolu-Sol 25.

TOLU-SOL BULLETIN (CONT.)

And it now has a higher aromatic content and better odor.

To develop this new family of solvents, Shell scientists adopted a manufacturing technique that gives more precise control over the composition of each of the Tolu-Sol grades.

Controlled composition

The naphthene content is kept low, because naphthenes, despite their high KB numbers, have relatively poor viscosity reducing power. However, aromatics have high solvency and good viscosity reducing power.

Shell carefully controls the proportions of aromatics in each grade of Tolu-Sol.

Aniline cloud points and lacquer dilution ratios show that the Tolu-Sol diluents will provide the solvency you expect.



Scientist in Shell Laboratory measures lacquer dilution ratios of Tolu-Sol. Ratios range from 1.22 to 1.92.

Greater uniformity

The Shell manufacturing technique produces thinners with dependable properties.

This new Tolu-Sol family can give you greater flexibility in establishing your own formulations.

Here, Shell discusses four important features of the new Tolu-Sol family.

1. *Compatibility.* The full family of Tolu-Sol thinners covers a wide range of solvencies (see chart). Aniline cloud points range from 148°F. to 55°F.



Range of solvencies of new Tolu-Sol family covers wide range of formulation requirements. Example: Low-aromatic Tolu-Sol 10 is ideal thinner for traffic paints and rubber cements.

and lacquer dilution ratios range from 1.22 to 1.92.

2. *Volatility.* The Tolu-Sol family has similar volatility with only small differences in evaporation rates.

3. *Viscosity.* All grades of Tolu-Sol have an unusually low naphthene content. *Because of this, Tolu-Sol thinners have very low viscosities for their respective solvency ranges.*

Their lower solvent viscosities can lead to lower finished solution viscosities. Or, at the option of the user, higher solids content with the same finished solution viscosities may be possible.

4. *Odor.* Because they are so highly refined, Tolu-Sol thinners have exceptionally low bulk odor and residual odor.

Wide distribution

Shell's new Tolu-Sol family is *available now* for delivery to all areas east of the Rockies.

Memo to West Coast formulators

New family of Tolu-Sol diluents is not yet available on the West Coast. There, Tolu-Sol W will retain the dependable properties you are accustomed to.

For complete information on Shell Tolu-Sol thinners, see your Shell Industrial Products Representative. Or mail the coupon below.

A BULLETIN FROM SHELL
—where scientists are working to provide better products for industry

—Mail coupon for copy of Technical Bulletin on Tolu-Sol—

Shell Oil Company,
50 West 50th Street,
New York 20, New York

Please send me a free copy of your Technical Bulletin No. SP-61-2 on the new family of Shell Tolu-Sol diluents.

Name _____

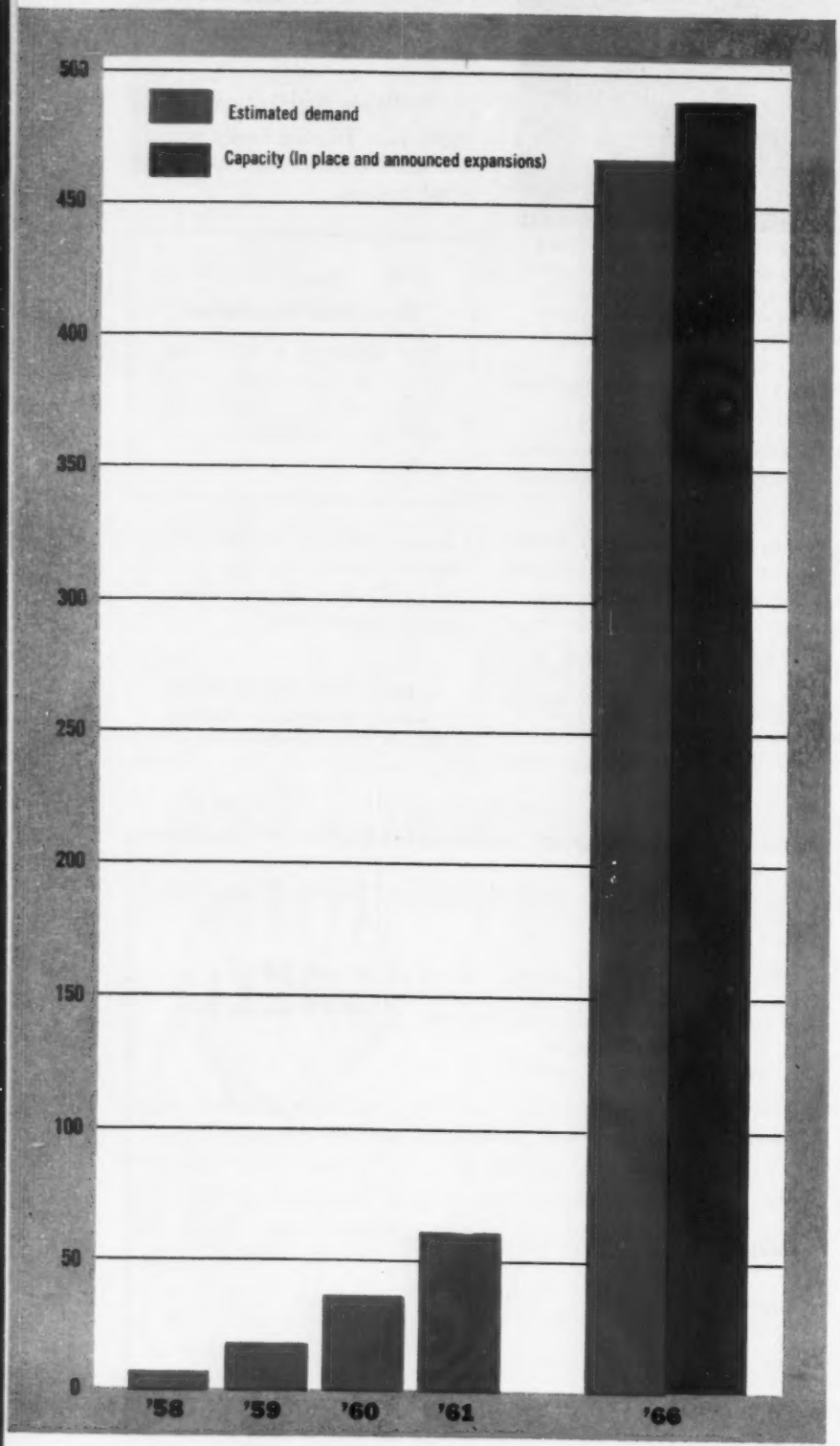
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City _____ **Zone** ____ **State** _____

The predicted big step-up in polypropylene demand—it will overtake capacity if producers stick to plans.



Reselling:

This week Humble Oil put onstream a 20-million-lbs./year unit at its Baytown, Tex., plant—the third new polypropylene facility to become operational within the past month. Several others are under construction. There's still good evidence, however, that polypropylene will mature smoothly; without the growing pains of serious overcapacity that have plagued most plastics.

This is how market observers interpret the extreme caution that has characterized the expansion programs of established firms. Right now, markets are growing fast enough to catch the current capacity buildup within the next few years. For example, polypropylene demand should reach at least 467 million lbs./year by '66, while in-place capacity plus planned expansions total about 490 million lbs./year.

Moreover, other companies in a good position to tackle PP manufacture are testing out the markets via reselling agreements. Six companies are now reselling: Du Pont, Carbide, Allied, Spencer, W. R. Grace and Rexall. Monsanto is expected to join the list soon.

Du Pont is reselling Hercules' polypropylene; Spencer is marketing Humble Oil's; W. R. Grace, is handling Novamont's; and Monsanto will soon be moving part of Dow's output. Allied and Rexall haven't revealed their sources, they are generally thought to be selling AviSun's material.

Carbide sums up its approach this way: "The amount of time and effort required to find and fully develop new markets for plastics is often underestimated. This reselling contract will enable us to develop the polypropylene market without the necessity, at this time, of a substantial plant investment."

As most of these companies have said to *CW*, their current agreements don't rule them out as future polypropylene producers. But if, as appears to be the case, they are deferring construction until the market can support their units, both they and their suppliers stand to gain. Result of deferment: idle capacity will be kept at a minimum and the reseller will

Key to Polypropylene Balance

have a trained sales staff when it finally launches production.

When Is It Going? Although '61 domestic polypropylene demand will total only about 60 million lbs., the '66 market is predicted to hit almost 500 million lbs. The major contributor to this glowing future will be injection molding—already polypropylene's most important end-use.

This year about 25 million lbs. is going into injection-molded products. And demand for PP is just starting to pick up. Good properties at low cost is PP's big sales point. The material is already cheaper per cubic inch than ABS (acrylonitrile-butadiene-styrene) polymers; nylon; urea formaldehyde; and cellulose acetate, butyrate or propionate.

These materials will get stiff competition from polypropylene for several years to come. In addition, PP will compete with linear polyethylene, impact styrene, copolymer styrene in uses where superior properties of PP outweigh its higher price tag—e.g., in applications where high heat resistance and dimensional stability are important. In addition, PP is even expected to dislodge metals, wood and glass from some long-standing applications.

Packed for Travel: Injection-molded automotive, appliance, furniture, luggage and houseware items are predicted to consume the lion's share of polypropylene during the next five years. Luggage and furniture could very easily become the biggest consumers. Sears, Roebuck & Co.'s polypropylene luggage appears to be packed with buyer appeal, and Alladin Plastics Co.'s polypropylene chairs are reportedly finding brisk consumer acceptance.

Although it may still be too early to class luggage and furniture as the most important factors in PP's injection-molding future, producers are confident that 170 million lbs./year of the resin will be used by molders by '66.

Film Star: Film and sheeting appear to be the second most promising PP application. Right now film and sheeting are just gaining commercial acceptance. Not more than about 5 million lbs. will get into this application during '61. But the film's attractive appearance and good physical properties, as well as its probable low price, augur a bright future. Polypropylene film's major competition will be cellophane and polyethylene, which now garner about 80% of the 1-billion-lbs./year film market.

At the same time, PP film is unlikely to take much of the market away from the "specialty" films such as vinylidene chloride. In all, polypropylene film and sheeting demand should reach about 110 million lbs./year by '65.

The other major market segments include coatings, wire and cable, pipe, blow molding, monofilament and multifilament textiles. Although each of these broad application areas is expected to expand in the next five years, their growth won't arc upward as steeply as film and injection-molding market segments. But for the long pull, optimism runs high on polypropylene's multifilament future. Hercules, AviSun, Reeves and Novamont either already have or will soon have plants to manufacture such fiber.

Although sizable sales and development efforts should unwind during the next few years, it's not likely that PP fiber will be able to carve itself a large share of the total textile market. By '66 polypropylene multifilament textile demand will likely be in the 35-million-lbs./year range.

Bottled Up Demand: Blow-molding

Polypropylene End-Uses

	Million lbs./year '61	'66
Injection molding	25	170
Film and sheeting	5	110
Blow molding	1	40
Monofilament	14	35
Multifilament	1	35
Coatings	1	25
Wire and cable	1	15
Pipe	1	7
Miscellaneous	11	30
Totals	60	467

Polypropylene Producers

PRODUCER	LOCATION	CAPACITY million pounds/year Now	By '63
AviSun	New Castle, Del.	100	100
	Port Reading, N.J.	25	—
Dow	Torrance, Calif.	30	30
	Bay City, Mich.	15	15
Firestone	Hopewell, Va.	5	5
Hercules	Lake Charles, La.	60	120
Humble	Baytown, Tex.	60	60
Novamont	Neal, W. Va.	25	25
Shell	Woodbury, N. J.	—	80
Texas Eastman	Longview, Tex.	20	30
El Paso—Rexall	Odessa, Tex.	—	25
	Total	340	490

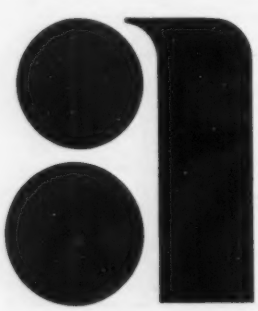


H.A. and D.M.B.

ANSUL H.A.—our trade name for Para Hydroxy Anisole (which you may also know as Monomethyl Ether of Hydroquinone)—has found widespread acceptance as a stabilizer for chlorinated hydrocarbons, motor fuels, rubber and plastics such as acrylonitrile and acrylates. It's also an excellent non-discoloring anti-oxident as well as a valuable chemical intermediate. May we also suggest your investigation of H.A.'s sister product—ANSUL D.M.B.—alternately known as Para Dimethoxy Benzene or Dimethyl Ether of Hydroquinone. D.M.B. is used in the manufacture of synthetic dyes and offers possibilities as a weathering agent in paints, lacquers, plastics and in sun tan lotions and creams. Its sweet-clover odor may suggest uses in cosmetic formulations. Samples, specification data and technical consultation are available. Please write ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN

PROPERTY DATA

Physical Properties Compound	H.A. para Methyoxy Phenol	D.M.B. para Dimethoxy Benzene
Chemical Formula	$CH_3OC_6H_4OH$	$C_6H_4(OCH_3)_2$
Molecular Weight	124.13	138.16
Boiling Point °C		
760 mm. Hg.	243°	213°
100 mm. Hg.	175°	140°
50 mm. Hg.	160°	123°
10 mm. Hg.	126°	89°
Melting Point °C	53°	56°
Density gms./ml. (65°C)	1.1106	1.0293
Solubility (25°C in gms./100 gms. solvent)		
Water	4.1	Insoluble
Benzene	69.5	177.0
Acetone	426.0	233.0
Ethyl Acetate	245.0	150.0
Alcohol	456.0	33.3
Color	Tan to white	White
Odor	Characteristic	Sweet Clover



ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN ● INDUSTRIAL CHEMICALS ● REFRIGERATION PRODUCTS ● FIRE FIGHTING EQUIPMENT

applications—such as plastic bottles—hold a '66 market potential of 300 million lbs. However, PP's low impact resistance at low temperatures will probably rule it out of many small-container applications. As a result actual blow-molded resin usage may well reach only 40 million lbs. in '66.

The coatings, wire and cable and pipe uses are still in their infancy. It's too early to predict their development with any exactness. However, it does not appear, right now, that any one of these uses will require more than 25 million lbs./year by '66.

Producers Lineup: There are now seven U.S. polypropylene producers, with plants at nine locations. Total combined capacity is about 360 million lbs./year. But by late '62 or early '63 there will be nine producers at 11 locations with a combined capacity of at least 490 million lbs./year (*see table, p. 101*).

AviSun, Novamont and Humble have just put plant expansions on-stream, while Hercules, Shell and Texas Eastman are working on expansions. In addition, Rexall, teamed with El Paso Natural Gas, expects to construct a polypropylene unit at Odessa, Tex.—size: 25 million lbs./year.

Although these expansions are sizable, so are potential polypropylene markets. Demand will match supply by '66 if no new plant construction evolves. But it's more likely that additional PP production units will be constructed—reseller agreements, however, are sparking hopes that expansion will not result in painful overcapacity.

Rosy for Rosin?

The world rosin picture should improve considerably next year, according to Chematar Pine Products Corp.'s H. L. Meyer. Last week, at the National Paint, Varnish and Lacquer Assn. meeting in Washington, D.C., Meyer predicted that world rosin demand would reach about 705,000 tons next year—a 10% advance in this country and 5% abroad. Meanwhile, production seems unlikely to exceed 680,000 tons. This points to a 25,000-ton trimming of the bulging, 200,000-ton world rosin stockpile (equivalent to one-third the average yearly rosin demand during the '58-'61 period).

Both U.S. and foreign rosin production will probably be cut back in '62.

SODIUM SULPHATE

(Anhydrous)

SALT CAKE

PRIOR CHEMICAL CORPORATION
420 Lexington Avenue
New York 17, N. Y.

New Aerosol Developments

Recent advances in aerosol technology reportedly eliminate problems in pressure-packaging two important classes of products: alcohol-based formulations and anti-perspirants.

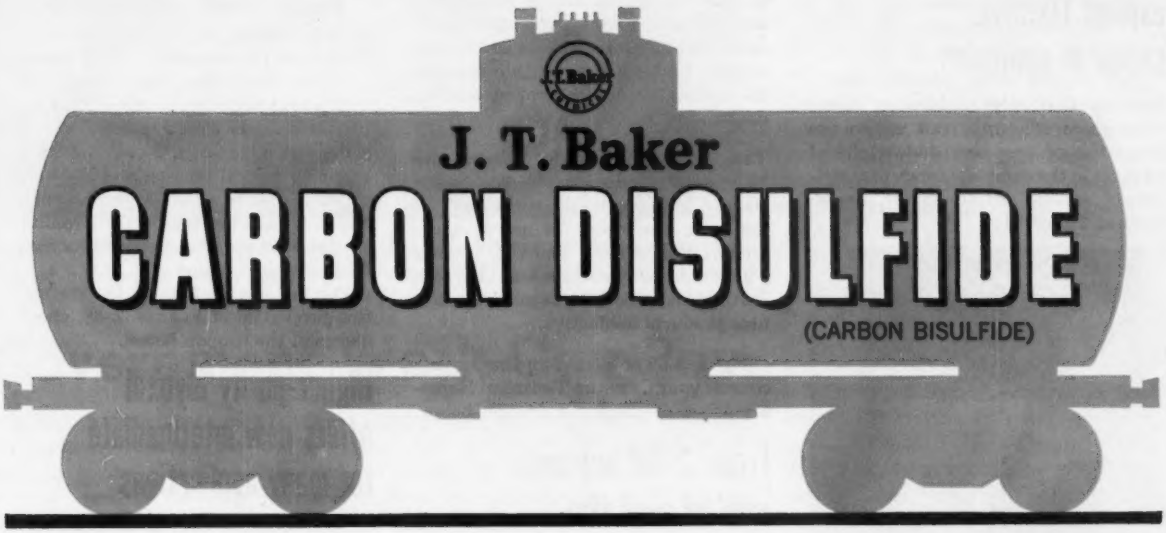
Nitromethane has been found to be effective in stabilizing alcohol-containing aerosols against metal container corrosion. And a new non-metallic valve and closure has been designed which minimizes clogging caused by drying out of aluminum salts used in most anti-perspirant and deodorant formulas. Both developments are seen as broadening the market for aerosols.

A comprehensive report on these new developments plus articles on new hard carbides, polyethylene chemical containers and UDMH appear in the November issue of U. S. I. Chemical News. See pp. 39-40 in the Nov. 4th issue of CW. Or, get the expanded Chem News by mail each month. Write U. S. I., Room 904, 99 Park Avenue, New York 16, N. Y.

U.S.I. U.S. INDUSTRIAL CHEMICALS CO.

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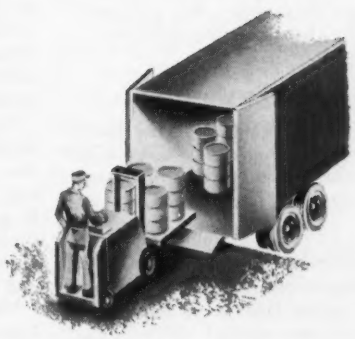
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High purity and uniformity—low cost

Do you use Carbon Disulfide in the manufacture of viscose rayon, cellophane or cellulose sponges? Rubber accelerators, flotation agents, carbon tetrachloride or specialties? Whatever your product, whatever your use, J. T. Baker's unique electrothermic process, combined with continuous distillation, assures you of low cost Carbon Disulfide of highest purity and uniformity—exceptionally free from other sulfur compounds. See specifications below. You're assured of on-schedule deliveries wherever your plant may be—at minimum transportation costs. Baker is one of the principal volume producers of Carbon Disulfide and ships your order from the nearest of several distribution points, in safety-equipped tank cars. Truckload and LTL lots of drums are shipped into most consuming areas.

May we quote on your needs? Write J. T. Baker Chemical Co., Executive Offices, Phillipsburg, New Jersey.



SPECIFICATIONS

Boiling Range	0.5°C.*
Specific Gravity at 15°/15°C.	1.270-1.275
Residue after Evaporation	0.001% Max.
Foreign Sulfides and Dissolved Sulfur	Passes Test**
Sulfite and Sulfate (as SO_2)	Passes Test**

*Recorded boiling point, 46.3°C.
**A. C. S. test for absence of these impurities in reagent grade carbon disulfide.

STANDARD CONTAINERS

TANK CARS: 8,000 gallon (83,000 lbs.) • 10,000 gallon (105,000 lbs.)
SINGLE TRIP DRUMS: 55 gallon, 10 gallon, 5 gallon.

J.T.Baker CHEMICAL

J. T. Baker Production Chemicals

PROGRESS REPORT

—TERGITOL 12-P Nonionics
—FLEXOL Plasticizer Z-88
—Glyoxal Special

Dodecylphenol adducts expand TERGITOL series of nonionics

Systems that rely on making water work more efficiently can utilize the properties of four new dodecylphenol adducts in the complete range of nonylphenol surface active agents, trademarked TERGITOL.



Members of the new TERGITOL 12-P nonionic series provide properties for equivalent detergency, but generate considerably less foam than their nonylphenol counterparts.

TERGITOL 12-P NONIONICS

TERGITOL 12-P-6 (dodecylphenol plus 6 mols of ethylene oxide) is soluble in aromatic and aliphatic hydrocarbons and ideally suited for sulfation.

TERGITOL 12-P-9 (dodecylphenol plus 9 mols of ethylene oxide) is an extremely low-foaming surfactant with good detergency properties. It is soluble in aromatic hydrocarbons.

TERGITOL 12-P-12 (dodecylphenol plus 12 mols of ethylene oxide) is a general-purpose nonionic that is completely water-soluble, and is highly effective in either built or unbuilt detergent formulations. Low foam generation suggests its application in controlled sudsing detergents.

TERGITOL 12-P-15 (dodecylphenol plus 15 mols of ethylene oxide) is a highly water-soluble nonionic surfactant. It has been developed for use as a detergent and wetting agent in systems where high temperatures and high concentrations of electrolyte make less soluble products ineffective.

For data on properties and quantities, consult your CARBIDE Technical Representative, or check the coupon below.

FLEXOL Z-88 improves hand of vinyl film, sheeting, and fabric

Although every phase of vinyl plastics production has already been covered by CARBIDE's fast-growing list of plasticizers, another high-quality plasticizer has been added to the line. It is FLEXOL Z-88 (di-2-ethylhexyl azelate).

Due to its high compatibility, FLEXOL Z-88 can be used as the sole primary plasticizer in applications demanding the maximum in low-temperature performance. Its relatively low volatility enables such plastics to maintain their properties over extended periods.

CARBIDE's new plasticizer provides a marked improvement in the drape, softness, and hand of vinyl film, sheeting and, particularly, coated fabrics, where it gives outstanding low-temperature protection. It also offers low water extraction, low soapy-water extraction, and excellent heat and light stability.

The low temperature performance of FLEXOL Z-88 makes it ideal for obtaining the hand, or soft pliability, automobile owners expect of vinyls.

Provides uniform, stable viscosities

In vinyl foams, which involve critical viscosities and require a higher degree of permanence than other vinyls, the uniform and stable viscosities of plastisols made with FLEXOL Z-88 are a definite advantage. FLEXOL Z-88 is added to general-purpose and low-temperature foams to modify viscosities and give good low-temperature results. It also is an excellent material for skin coats for vinyl foams.

For full information on the distinctive properties of FLEXOL Z-88, check and mail the coupon below.

Higher-purity Glyoxal offers new intermediate for many applications

CARBIDE has developed a new process for producing glyoxal of higher purity, with low color, and without traces of either ethylene glycol or formaldehyde. To distinguish the new CARBIDE product from other grades it is identified as Glyoxal Special.

In reconstituted tobacco, Glyoxal Special serves as an insolubilizer for the binder. Its better color extends its use as an insolubilizer for adhesives and as an intermediate for tetra-methylol acetylene diureine and other crease-proofing agents for textiles.

Glyoxal Special's unique two-carbon dialdehyde structure and its reactivity also suggest use as an intermediate for pharmaceuticals, agricultural chemicals, textile and epoxy resins, and in other areas where new chemical structures are continually being synthesized.

For information on properties and delivery of development quantities, call your CARBIDE Technical Representative, or use the coupon below.

FLEXOL and TERGITOL are registered trade-marks of Union Carbide Corporation.

Union Carbide Chemicals Company
Div. of Union Carbide Corporation
270 Park Avenue, New York 17, N. Y.

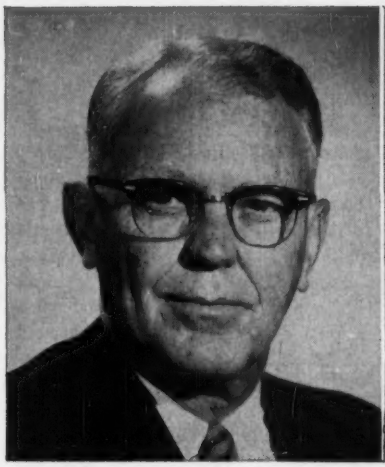
Send information on:
- ☐ TERGITOL 12-P Nonionics
- ☐ FLEXOL Plasticizer Z-88
- ☐ Glyoxal Special
- ☐ Physical Properties of Synthetic Organic Chemicals

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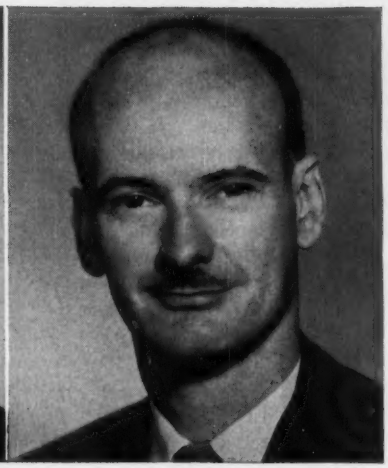
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UNION CARBIDE CHEMICALS



Garrett's Spangler warns against pitfalls of bidding on wrong contracts.



M&CP's Steinbruch stresses patience required in winning government work.

Government Work Can Pay

It doesn't make much of a profit—yet contract research for the government is the object of keen and growing interest in the chemical process industries. Some companies, in fact, tenaciously seek it out. Minerals & Chemicals Philipp Corp. (Menlo Park, N. J.), for example, will begin work this month on a government research contract that took more than two years to bag. What's the inducement?

"We expect to advance our technology in certain fields and open up new channels of potentially profitable investigation," says M&CP President Charles Specht. "This is our most important incentive."

Even in the aerospace industry—where possibly 80% of research and development is government financed (compared with less than 20% in the CPI)—immediate dollar income for services rendered is not the overriding consideration in seeking out government R&D contracts. Admiral Selden Spangler, research director of aerospace-supplier Garrett Corp. (Los Angeles), recently gave an American Management Assn. briefing session three reasons for bidding on such contracts: (1) to add to company prestige, (2) to maintain R&D groups for which the company is likely to have subsequent need, (3) to pay for R&D that is applicable to other company lines or to potential products.

And for firms with an interest in performing defense production, the research contract can be a springboard. When American Machine & Foundry, for example, makes research proposals it often is hoping that the same project will lead successively to engineering and production contracts.

New Field: Minerals & Chemicals offers a fresh viewpoint on government work. To gear itself for this activity, the company three years ago appointed Robert Steinbruch to the new post of manager of contract research. His job: to boost the company's research effort in areas of interest to it through outside contract support. Active solicitation of industrial contracts in novel areas where no patent protection has been established was abandoned early in the game. The company found it virtually impossible to arrive at agreement on rights covering work prior and subsequent to the contract work.

Steinbruch, who had experience in contract research while with the Air Force, quickly brushed up on the broad classes of government contracts, based on the degree of rights held by the company: (1) company patent with free government license, (2) government patent with exclusive company license, (3) government patent in the public domain. The type of contract that could be obtained depends on many factors, including the company's background in the field and the degree of the government's interest in it.

M&CP officials felt that the company's background in adsorbent technology qualified it to solicit work in the field of radioactive waste disposal. Steinbruch's first approaches to the Atomic Energy Commission in '59 were greeted with interest but also with an evident lack of information on M&CP. To acquaint government agencies with the company, he compiled a brochure on its research capabilities and its key research people.

The next step for the firm in the pursuit of the waste-disposal contract was a thorough literature study to bring it up to date in the field. Finally the company had to perform initial laboratory studies to substantiate its reasons for saying that it could use contract funds fruitfully. In early '60 the company was finally ready to submit an unsolicited proposal to AEC.

Further preliminary work was carried on during the year, and favorable results were presented to AEC representatives from the agency's headquarters and three regional labs at a meeting with M&CP early this year. A revised proposal submitted in May was included in AEC's budget in July, and work will get under way in November.

Although the company was not reimbursed for its preliminary studies, it retained certain patent rights because of its strong background in the adsorbent field. And while this contract is a relatively small one, the process of acquiring it gave the company the procedural know-how it needs in trying to land others.

In One Basket: The problem of how best to manage a large number of government contracts was answered by Monsanto Chemical Co. last year, when it formed Monsanto Research Corp. MRC was set up to consolidate all of Monsanto's growing government research work, which had previously been scattered among several divisions.

Greater efficiency was cited by MRC President Howard Nason as

the reason for the move. As a result Monsanto is able to increase its skills in areas that are not yet commercially advantageous, and government agencies are benefited by having to contact just a single organization in Monsanto.

Stability in MRC's research program is provided by the wide gamut of projects covered—including solid propellants, auxiliary power sources, organic coolant-moderators for nuclear reactors and water-desalting methods—and by the relatively small size of individual contracts.

Liaison Group: A less drastic move, but one also made with the purpose of furthering efficiency, was Dow's establishment last year of the defense liaison and planning group in its Chemicals Dept. (Actually, the group serves all Dow departments.)

George Morrison, manager of the group, defines its purpose this way: "To seek areas of mutual interest to Dow and the government, where Dow can apply the industrial research factor to their mutual benefit, and to secure contracts in these areas."

The group, though located in Dow's headquarters in Midland, Mich., makes frequent use of the company's business office in Washington, D. C., during negotiations. Once a contract is obtained, however, the researcher responsible for it makes the reports to the government agency involved.

Type of Work: The reasons cited by Garrett's Spangler for seeking R&D contracts led him to the following conclusions about the desirability of different types of contracts: "In basic research, outside contracts are most often not worth the effort required to get them; in applied research, you must carefully balance all the factors involved to insure that you are not losing more than you can gain by taking outside support; in development, you should make every effort to get the maximum of contractural support."

Among the factors, in addition to proprietary rights, to be taken into consideration are definition of allowable charges, who is to do the work, what is required in the way of demonstrations and reports, and what is considered satisfactory completion of the contract. In addition, Spangler emphasizes that a firm should bid for work only in a field in which it can do an outstanding job and in which the competition is not already firmly entrenched.

Stepping Stone: AMF, whose government work is spread among several divisions—collectively called the government products group — looks upon research contracts as possible stepping stones to more lucrative future contracts, when a fruitful idea advances to the hardware stage.

Even when followup contracts fail to develop, however, the company considers that it has benefited by developing its capabilities and having worked in an area that might eventually lead to proprietary products. And the added motives of patriotism, prestige and profit are not overlooked by the firm.

To keep its sights firmly on proprietary targets, AMF conducts only company-sponsored research at the Springdale, Conn., laboratories of its Research & Development Division. But some government work might be done in almost any of the company's many other labs.

Clearly not a way to realize immediate profits, government contract research nevertheless plays an important role in the commercial position of those who seek it carefully and perform it well.

Fuel-Cell Combine

A new British company, Energy Conversion Ltd., has been formed to promote research and development of fuel cells. This firm is sponsored equally by four concerns: state-sponsored National Research Development Corp., British Petroleum Co. Ltd., Guest, Keen and Nettlefolds Ltd. and British Ropes Ltd.

The new company's tie-in with U.S. firms indicates that its efforts will be directed toward further development of fuel-cell designs now shared with the U.S. NRDC has reciprocal arrangements with United Aircraft Corp. (East Hartford, Conn.) and Leesona Corp. (Providence, R.I.) for licensing of patents and interchange of technical information. The benefits NRDC derives from these arrangements will accrue to Energy Conversion. British Petroleum will handle chemical operations, and the two other concerns will help with metallurgical problems. Energy Conversion will build a lab near London.

New Bacteria Fighters

Highlights of last week's Interscience Conference on Antimicrobial Agents and Chemotherapy in New York included news of new semisynthetic penicillins and a new antibiotic found effective in laboratory tests on cancer cells. Also of note: reports on novel antifungal agents and further information on the recently developed antibiotic, actinospectacin.

Smith Kline & French Laboratories (Philadelphia) reported on a new derivative of 6-aminopenicillanic acid (called SK&F 12141), said to be highly effective against staphylococcal infections even when administered orally. Researchers from Lilly Research Laboratories (Indianapolis) gave results of tests with levopropylcillin (L-α-phenoxypropyl penicillin), indicating that it was more effective than seven other penicillins in fighting four major classes of bacteria in animals.

The new cancer-fighting antibiotic was developed by Upjohn Co. (Kalamazoo, Mich.) from a new microorganism species, *Streptomyces pactum*. The drug, tabbed pactamycin, was found to be highly active against human cancer cells in laboratory tests and against tumors in mice and hamsters. Cancer Chemotherapy National Service Center (Bethesda, Md.), which sponsored the work, is arranging for preliminary clinical trials of the drug in cancer patients.

Progress in antifungal research was noted by a group of researchers from Texas Woman's University (Denton), which found that 6-diazo-5-oxo-L-norleucine inhibits fungal growth in concentrations lower than required concentrations of any of seven other compounds tested. And Columbia University's Harry Seneca reported that 1,2-propanediol diacetate, a relatively simple compound, shows a wide range of germicidal and fungicidal properties in living bodies, yet does not irritate the tissue.

Upjohn reported on promising clinical results with actinospectacin, which it developed earlier this year, but noted that the drug is not effective when orally administered. Both Upjohn and Abbott Laboratories (North Chicago)—which calls the drug M-141 — note that actinospectacin is more active in stopping growth of bacteria than in killing them.

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November 2, 1961.

Midwest Science Push

Midwest Research Institute (Kansas City, Mo.) and National Aeronautics and Space Administration are cosponsoring a program to expand science, education and industry in a six-state Midwest region.

A $250,000 annual effort, the program has a twofold objective: (1) to stimulate space sciences research and education in universities in Arkansas, Iowa, Kansas, Missouri, Nebraska and Oklahoma; (2) to increase industry's use of space technology in these states.

MRI will assess the regional skills and facilities available for research, graduate education and manufacturing. This information will be passed on to NASA, which will then route scientific data and current developments through MRI to the Midwest firms and universities.

Novel Cell-Breaker

The first cell disintegrator to work continuously is now a research tool at Olin Mathieson's Squibb Division (New Brunswick, N.J.). In operation for about six months, the new equipment is proving valuable in research aimed at better enzyme preparation.

The device is a high-speed shaking apparatus (6,000 cycles/minute), has a stainless steel chamber with inlet-outlet system. Microorganisms put in at one size emerge as a suspension of separated cells that readily yield enzymes.

EXPANSION

- Linde Co., Division of Union Carbide Corp., is again expanding its Tonawanda laboratories, near Buffalo, N.Y. It's the second expansion at that site in the past three months; in August a $2.5-million plant expansion was begun. The new move will provide 10,000 sq.ft. more laboratory floor space for Linde and the Silicones Division of Union Carbide Cost: $215,000.
- National Aeronautics and Space Administration's Marshall Space Flight Center has invited bids on construction of a $500,000 Test Division engineering building.
- Monsanto Chemical Co.'s new, $10-million research complex in suburban St. Louis (Creve Coeur, Mo.)



PLASTICS · PAINTS · TEXTILES · WOOD · PAPER

In recent years, antimony oxide has found greatly increased use as a flame retardant in a wide range of flammable materials—particularly plastics. Polyolefins, polystyrene, vinyls, polyesters, acrylates, epoxies and urethane foams are among the plastics in which antimony oxide has been used to provide the necessary degree of safety for consumer products. The application techniques are similar to those long used in paper, wood, textiles, paint, asphalt and rubber.

A bibliography, "Reported Uses of Antimony Trioxide as Fire and Flame Retardant," has been compiled by M&T and is available on request. Offered by M&T are grades of antimony compounds specially made for these applications. Particularly interesting is their range of opacity, permitting optimum formulation when color and appearance is a consideration. Send for technical literature on THERMOGUARD*H, THERMOGUARD*L, and M&T Flame Retarder. These three antimony-based compounds offer a wide range of tinctorial strengths. *Trademark

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was recently dedicated. It brings together about one-third of Monsanto's research activities, will put emphasis on basic studies.

• The Celanese Polymer Co., a division of Celanese, has opened a new laboratory at Clark, N.J., devoted to finding new uses for polymers in plastics. It is the newest unit among Celanese's $17.5-million research and development facilities.

• International Rectifier Corp. (El Segundo, Calif.) has acquired all assets, properties and rights of Industrial Research Laboratories from Honolulu Oil Corp. The laboratories produce bimetallic alloys with highly developed metallurigcal fabrication techniques.

• Richardson-Merrell, Inc., will build a $2-million research laboratory for study of infectious diseases under a $5.8-million Army contract. Location: Swiftwater, Pa.

• A new, multimillion-dollar research center was formally dedicated by Diamond Alkali Co. in Concord Township, Ohio. Built on an 800-acre site, it consists of three major buildings for research administration, process development and high-pressure studies.

• The Greater Ann Arbor Research Park (Ann Arbor, Mich.) has taken on its first tenant, Federal-Mogul-Bower Bearings, Inc. This firm will construct a laboratory on the site for work in metallurigcal and chemical research in the field of nonferrous metals and powdered metals.

LITERATURE

• The Franklin Institute (Philadelphia) has started a new science information service that will do literature searches in areas of mathematics, engineering, physics, chemistry and industrial processing. The service includes bibliographic compilations, annotated bibliographies, article abstracts on a regular basis, literature monitoring and translations.

• "Patents, Research and Management," a guide for inventors and executives, has been published by Central Book Co., Inc. (Brooklyn). The 10 chapters of the book reproduce the 10 sessions of a patent law course jointly sponsored by Engineers' Club of Philadelphia and Philadelphia Patent Law Assn. Also just published by the same company is "Dynamics of the Patent System."

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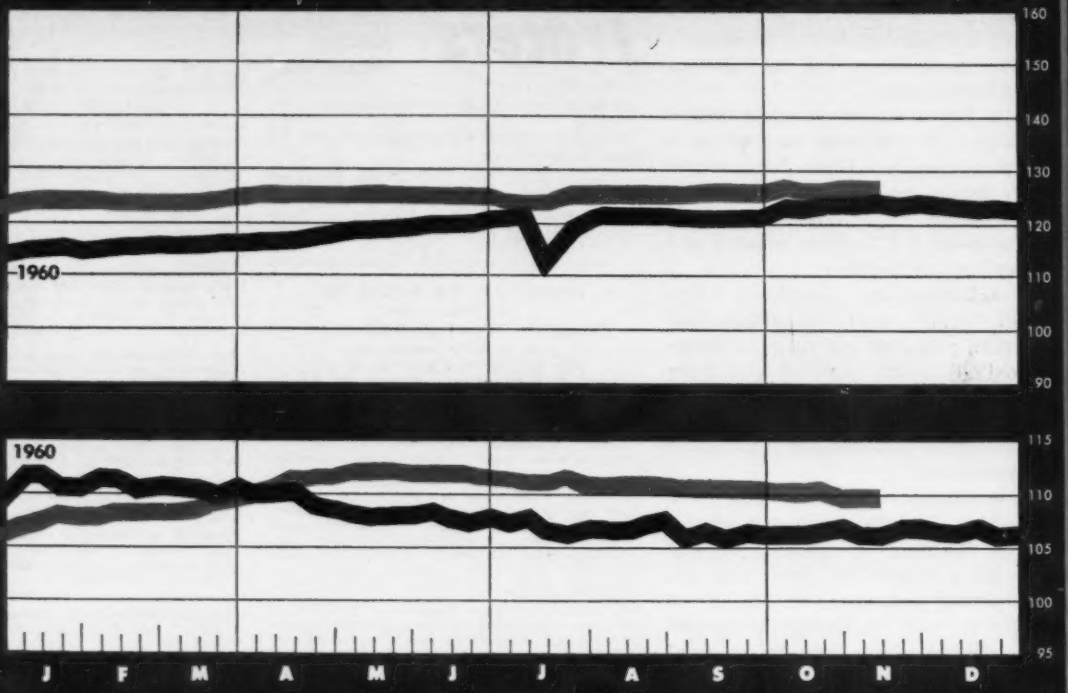
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BUSINESS BENCHMARKS



NOVEMBER 11, 1961

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-1949=100)	126.4	126.2	125.1
Chemical Week wholesale price index (1947=100)	109.4	109.4	106.5
Stock price index (12 firms, Standard & Poor's)	53.61	53.45	45.24
Steel ingot output (thousand tons)	2,057	2,042	1,545
Electric power (million kilowatt-hours)	15,263	15,162	14,271
Crude oil and condensate (daily av., thousand bbls.)	7,128	7,118	6,821

	EXPORTS			IMPORTS		
(Figures in million dollars)	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	141.9	149.7	140.9	28.7	28.6	28.0
Coal-tar products	16.0	18.4	12.7	6.5	6.3	5.6
Industrial chemicals	25.6	23.5	26.8	8.3	10.0	10.0
Medicinals and pharmaceuticals	22.1	25.0	24.8	3.3	2.8	2.4
Fertilizers and materials	8.6	11.0	10.7	7.2	6.3	6.5
Vegetable oils and fat (inedible)	8.4	6.3	14.0	7.3	7.7	6.1

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FACTORY SALES OF PASSENGER CARS



MANUFACTURERS' SALES OF TEXTILES



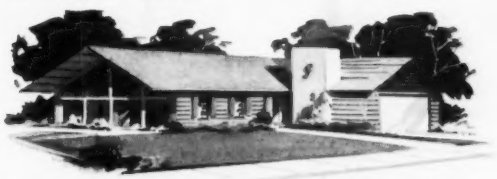
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If your profit margin keeps getting thinner, try CAB-O-LITE — the performance-proved extender. Write for Brochure No. 726 . . . or phone us for fast action. LIberty 2-7300.



CABOT CORPORATION

CABOT

MINERALS AND CHEMICALS DIVISION
125 HIGH STREET,
BOSTON 10, MASS.

WITHOUT CAB-O-LITE	lbs./gal.
TiO_2	1.27
PbZn	4.24
Talc	2.97
Oil	4.33

Raw Material Cost $1.704

WITH CAB-O-LITE	lbs./gal
TiO_2	1.27
PbZn	4.24
CAB-O-LITE	5.18
Oil	3.94

Raw Material Cost $1.660



TITANOX® helps brighten up the party

Nothing brightens up the party like gay and cheerful paper accessories. And nothing is better suited to the white pigmentation of these and other paper products than TITANOX titanium dioxide pigments.

There are one or more types, rutile or anatase, to produce clean whiteness and opacity in food board and similar stocks and to increase brightness and opacity of all lightweight papers. And because of their uniformity of all properties and ease of handling, TITANOX white pigments help speed the production process.

As it is with paper, so it is with a wide range of other products—there's a TITANOX pigment for virtually anything that requires whiteness, brightness or opacity. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

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